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*Deceased.

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A History of Fluvial Navigation: The Example of the Meuse

MARC SUTTOR

WHAT kinds of documentary evidence provide the basis for writing the history of rivers and for reconstructing the vanished boats? How can we analyse such documents in order to provide an account of the development of navigation on a river in the past? The answer to these questions provided here is based on the study of navigation on the mid-Meuse—that is to say between Mézières in the French Ardennes and Maastricht in Dutch Limburg[1]—from the beginning until the major regulation works undertaken from 1853 onwards.[2] The problems defined raise three sets of questions: the first concerning the river, the second concerning the boats, and the third—produced by these—concerning navigation.

First I shall describe the navigability of the Meuse in the past. I shall then provide an account of the history of the boats used on the river, describe their distinctive features and their mode of construction. Finally, I shall comment on navigation techniques.

NAVIGABILITY

In order to understand the issues involved in navigability, it is necessary to appreciate the geographical features—general setting, regime, discharge—the extreme flow variations, and the course and profile of the river.

Our description of the Meuse cannot rely solely on observations gathered from the sources from the XIIIth to the XVIIth century, since only exceptional meteorological phenomena were recorded. This means that we have little exact information, and none of it in the form of figures. The most recent scientific documentation we have comes from the studies made by engineers during the middle of the XIXth century. But it appears that the information recorded at that time can help us to work out the characteristics of the river some centuries earlier. Only minor geographical accidents—erosion, aggradation and side movements—and also still less important alterations due to man's action have modified the regime, discharge and profile of the Meuse in limited sectors of the river. Such modifications are unimportant.[3] In fact, if we take the life of the river as a whole, the "historic" Meuse reached maturity with a stable hydrographic regime.[4] Engineer H. Guillery reports on the state of the river before the major canalization works undertaken shortly after 1850, giving a fairly precise geographical

1. In 1930, F. Rousseau published an outstanding synthesis, *La Meuse et le pays mosan en Belgique. Leur importance historique avant le XIIIe siècle* (reprint, Brussels, 1977) (*Annales de la Société archéologique de Namur*, XXXIX (1930)), in which he brought out the political, economic and geographical originality and unity of the mid-Meuse regions, thus opening up the way for an historical study of the *pays mosan*. His study was followed by some monographs on the subject, including A. Joris, "A propos du commerce mosan au XIIIe et XIVe siècle," *Annales du XXXVIe Congrès de la Fédération archéologique et historique de Belgique* (Ghent, 1956), 227-244. Further information on the subject can be found in our study *La navigation sur la Meuse moyenne des origines à 1650* (Liège-Louvain, 1986) (*Centre belge d'histoire rurale*, publ. no. LXXXVI).

2. See P. Questienne, *La navigation en Wallonie. Catalogue de l'exposition organisée au musée de la Vie Wallonne à Liège du 16 mars au 18 juin 1978* (Liège, 1978), pp. 57-60.

3. We can for instance observe that the settlement of the river is made in a regular, almost uniform way, as attested by the position of the fords across the Meuse, which did not change between the XVIth and XIXth centuries (lists made in 1568: ed. D. D. Brouwers, "Les gués de la Meuse namuroise en 1568," *Namurcum*, VII (1930), 37-40; in 1695: ed. J. Muller, "Plans anciens du génie militaire français. Les gués de la Meuse en aval de Dinant (1695)," *Bulletin de la Société royale «Le Vieux-Liège»*, IV (1959), annexe 2 et plan, p. 411; map established in 1771-1778: *Carte de cabinet des Pays-Bas autrichiens levée à l'initiative du comte de Ferraris* (Brussels, 1965) (*Crédit communal de Belgique*. Coll. *Histoire. Pro Civitate*, série in-4°, no. II), VI, plate 117 (2 and 4), VII, plate 118 (2); and last, in 1843: H. Guillery's reports, *La Meuse—Etudes faites par ordre du gouvernement belge* (*5 rapports*) (Brussels, 1843), pp. 9-12.

4. See, generally speaking, M. Pardé, *Fleuves et rivières* (Paris, 1968) (Coll. *U*) and P. Macar, "A propos du profil d'équilibre des rivières et de ses modifications," *Annales de la Société géologique de Belgique*, LIX (1936), 172-176.

description. Contemporaneous geographical studies complete these data bases.[5]

* * *

The midsection of the Meuse has an intriguing unity from the geological, geographical, climatological and hydrographical points of view. It extends 236 km, from Mézières to Maastricht and has a surface area of twenty thousand four hundred square kilometers, although only a quarter of the length of the river and almost a third of the total area of the basin of the Meuse. Furthermore, the middle course of the river drains the majority of its tributaries, which gives a very typical broad and rounded aspect to that part of the basin. The width of the Meuse varies from 80 to 120 m at Dinant, increases in the neighbourhood of Huy to between 100 and 140 m, and reaches 150 m at Maastricht.[6]

The regime of a river is defined by its discharge variations. These depend on meteorological factors (rainfall, evaporation, seasonal variations) and hydrological factors (altitude, slope, low water level). The yearly average discharge of the Meuse undergoes important fluctuations according to the seasons. During the summer months the run-off coefficient is very limited. The greater part of the rain water—to which is added the melted snow—appears during the winter months.[7] The fact that we have two hydrographical seasons—low water during the warm season, from May to October, and high water during the cold season, from November to April—is typical of an oceanic river regime.[8] Furthermore, the general slope is important, particularly between Liège and Maastricht.[9]

Let us remind ourselves of the features of the mid-Meuse: a very wide basin draining the waters of a greatest number of tributaries; very irregular discharge and high precipitation level; strongly marked seasonal fluctuations: the average values for July and February can vary more than from one to six; and, finally, the major significance of the run-off coefficient, due, among other factors, to the steep slope.[10]

The extreme variations in discharge are the results of "meteorological accidents." In fact, the very first pieces of information we have concerning the river deal with these phenomena. What struck the chroniclers and annalists—both Medieval and post-Medieval—most forcefully was the "abnormality" of a drought, a frost, or a Meuse flood.[11]

After a long period of dry weather the river can almost dry up, and its discharge can fall down as low as 30 m^3/sec. Any traffic on the Meuse is then interrupted and the river can easily be forded on foot. A major drought in Liège during 1198 is, for instance, recorded by Renier de Saint-Jacques.[12]

The river freezes during hard and prolonged winters, probably when there is a moderate discharge. During the winter of 1363-1364, it froze from 3 December, and was still more bitterly cold from mid-January to the end of March. The Meuse was iced over and people could travel from Liège to Huy on the frozen river.[13] As a result, there was unemployment on the river craft, but some carts could sometimes travel

5. H. Guillery, op. cit., H. Breuer, *Die Maas als Schiffahrtsweg* (Wiesbaden, 1969) (*Aachener geographische Arbeiten*, fasc. I), 1-45, and, more particularly, J. Vereerstraeten, *Le bassin de la Meuse, Etude de géographie hydrologique* (Brussels, 1972) (*Revue belge de Géographie*, XCIV (1970)).

6. M. Suttor, *La navigation . . .*, pp. 34-35.

7. M. Suttor, op. cit., pp. 35-37. At Visé, between Liège and Maastricht, for the period 1954-1963, the low water minimum was in July (70 m^3/sec.) and the high water maximum was in February (436 m^3/sec.) (J. Vereerstraeten, *Le bassin de la Meuse . . .*, p. 92 and p. 85).

8. Ibid., p. 109 and p. 334; generally speaking, see M. Pardé, *Fleuves et rivières . . .*, pp. 88-95.

9. M. Suttor, *La navigation . . .*, p. 36 and n. 29.

10. These important seasonal variations are best illustrated by the run-off coefficient; it can be obtained by the ratio between the volumes of the water fallen and run off, and this according to the slope of the river (J. Vereerstraeten, *Le bassin de la Meuse . . .*, p. 98). An excellent definition of the phenomena will be found in M. Roche, "Les équations générales de l'écoulement," *Hydrologie. Mélanges offerts par ses amis et disciples à Maurice Pardé, professeur honoraire de Potamologie à l'Université de Grenoble* (Gap, 1968), pp. 585-595.

11. Further information can be found in the critical catalogue of the meteorological events in the region from 1000 to 1425, published in the valuable and excellent study by P. Alexandre, *Le climat en Europe au moyen âge. Contribution à l'histoire des variations climatiques de 1000 à 1425, d'après les sources narratives de l'Europe occidentale* (Paris, 1987) (*Ecole des hautes études en sciences sociales, Recherches d'histoire et de sciences sociales*, XXIV), 336-595, *passim*. Information on the subsequent period will be found in C. Douxchamps-Lefevre and L. Dufour, *Documents inédits concernant des événements météorologiques dans le Namurois au XVIIe siècle* (Brussels, 1976) (*Institut royal météorologique de Belgique. Publ. série B* (*in-8°*), no. LXXXV), 7-47.

12. Probably before Christmas: *Reineri Annales* (ed. L. C. Bethmann and J. Alexandre (Liège, 1874) (*Soc. des bibliophiles liégeois*, no. XII)), 61. Day by day meteorological information can be found in these annals (P. Alexandre, *Le climat en Europe . . .*, p. 63).

13. *Annales S. Jacobi Leodiensis minores* (ed. L. C. Bethmann and J. Alexandre (Liège, 1874) (*Soc. des bibliophiles liégeois*, no. XII)), 28, and the *Chronique liégeoise de 1402* (ed. E. Bacha (Brussels, 1900) (*Commission royale d'histoire. Publ. in-8°*), p. 349. See also M. Suttor, *La navigation . . .*, p. 40 and nn. 46-47, as well as P. Alexandre, *Le climat . . .*, p. 62 and p. 66.

across the ice. This situation was recorded in 1513 for the Liège to Maastricht section of the river.[14]

High floods, with the Meuse water going over its average maximum level, can occur in summer as well as in winter. But the relatively frequent winter floods are much better known. They are due either to a sudden thaw accompanied by an ice-boom, or to long periods of rain. Ice-booms seriously damage the installations on or close to the river. The 1274 ice-boom shook the Maastricht bridge so violently that it had to be completely rebuilt.[15] In 1408 the ice knocked down the wooden bridges at Seraing, Amercoeur (Liège), and Visé.[16]

Heavy rainfall also causes high floods and extensive damage. On December 2nd, 1300 the Meuse became a raging torrent which swept away the beams from the old bridge at Huy; the flood water also struck and shook an arch of the new bridge, under construction further downstream.[17] Heavy rain caused the river Meuse to flood Liège during 1374. On January 4th the water reached the high altar of the monastery of the Frères Prêcheurs en Ile, and on January 11th and 12th a second flood took the water level still higher.[18] As a result of a major flood all communication was cut off downstream of Dinant during February 1409; the bridge across the Meuse at Namur was damaged, several buildings were knocked down, and the Pont des Arches in Liège was carried away.[19]

The features of forces involved in such phenomena are now understood thanks to recent studies in geography. The force of a flood at a given river point depends on the number of runnels that flowed into it at the same time. The number is determined by the basin area, the amount of rainfall, the saturation level of the ground, and the river slope.[20] Owing to those features the river Meuse is particularly prone to the propagation of sudden and terrible, but short, floods. Its waters sometimes rise from 4 to 5 meters, or even 6 or 7 meters above the low water level. They move from the mean-water bed of the river to its high-water bed, and the discharge can reach 1,000 to 2,000 m^3/sec. for several days, and as much as 2,500 to 3,000 m^3/sec. for some hours.[21]

Such meteorological "accidents" are spectacular, shortlived and infrequent; they do not affect the navigation on the Meuse very much and in any case are far less significant than "average" floods or periods of drought.

The navigation conditions—the degree of navigability on the river—are indeed very variable. Because they are determined by the profile and the course of the river in accordance with seasonal variations and with the considered place—further upstream or downstream—the capacity of the river Meuse to carry a boat varies all along its course and all through the year.

It is from Mézières upstream that navigation is possible throughout the year, for the benefit of boats of a limited tonnage.[22] On the lower Meuse, large boats coming from Holland only exceptionally go upstream from beyond Venlo and Roermond—in Dutch Limburg—to reach Maastricht or Liège.[23] During the summer time, on the middle part of the river, the largest among the boats meet major obstacles when they approach the upper Meuse; downstream, they cannot go any farther than Zaltbommel on the river Waal in the Netherlands, because the draught is too shallow.

14. *Chroniques du XVIe siècle. Règne d'Erard de la Marck* (ed. S. Balau and E. Fairon (Brussels, 1931) (*Chroniques liégeoises Commission royale d'histoire. Publ. in-4°*, II)), 351-352.

15. M. Willemsen, "Inventaire chronologique des chartes et documents de l'église Saint-Servais à Maastricht," *Bull. de la soc. historique et archéol. du Limbourg*, II (1865), no. 12, 175 (deed of 17 September 1274).

16. Jean de Stavelot, *Chronique* (ed. A. Borgnet (Brussels, 1861) (*Commission royale d'histoire. Publ. in-4°*)), p. 113. Seraing: about five km southwest of Liège, right bank of the river; Amercoeur: suburb of Liège, right bank of the river.

17. Jean de Hocsem, *Chronicon* (ed. G. Kurth (Brussels, 1927) (*Commission royale d'histoire. Publ. in-8°*)), p. 102, the *Fragments de la chronique de Jean de Warnant à partir du règne d'Henri de Gueldre, d'après un manuscrit de Tongerloo* (ed. S. Balau (Brussels, 1913) (*Chroniques liégeoises, Commission royale d'histoire. Publ. in-4°*, I)), 51 and the *Chronique liégeoise de 1402*, p. 244; concerning the events, see A. Joris, *La ville de Huy au moyen âge. Des origines à la fin du XIVe siècle* (Paris, 1959), p. 136 and pp. 169-170, M. Suttor, *La navigation . . .*, p. 45 and nn. 70-71, as well as P. Alexandre, *Le climat . . .*, pp. 65-66 and p. 72.

18. *La Chronique liégeoise de 1402*, pp. 358-359.

19. *Cartulaire de la commune de Dinant* (ed. S. Bormans (Namur, 1880), I, 164, n. 3 and 168-169.

20. J.-F. Lambermont, "La Meuse. Le régime des eaux, les crues, les inondations, la signalisation de celles-ci et les travaux de protection contre les inondations (normalisation, digues, etc.)," *Liège, la Meuse et le bassin mosan. Association française pour l'avancement des sciences, LXIIIe congrès, Liège, 1939* (Liège, 1939), 97-98.

21. J. Vereerstraeten, *Le bassin de la Meuse . . .*, p. 89.

22. J. Rigault, "La navigation de la Meuse au XVIe siècle vue du péage de Château-Regnault," *Actes du XCVe congrès national des sociétés savantes, Reims, 1970. Philologie et Histoire* (Paris, 1972), II, 136, 138-139 and 141-142; see also M. Suttor, op. cit., p. 49.

23. T. L. M. Thurlings, *De Maashandel van Venlo en Roermond in de XVIde eeuw (1473-1572)* (Amsterdam, 1945), pp. 130-132; see also M. Suttor, op. cit., pp. 49-50.

The clearest section and profile representation of the river is based on a study made during low water, when the water stands only in the "useful" part of the mean-water channel, i.e., the navigable river channel. The irregularities in the slope of the mid-Meuse appear most obviously from just after July to September. The character of the river is that of a huge staircase with 23 steps between Givet, on the French border, and Liège, where slackwater reaches alternates with gravel banks and rapid currents. Navigation becomes treacherous and difficult when the navigable channel crosses the lines of rocks. These produce very strong currents as at Marche-les-Dames, downstream from Namur, and sometimes a very narrow channel, like that at Flône next to Huy, and dangerous shallows, as at Namur.[24] Other difficulties arise when the channel suddenly switches banks, as at Marche-les-Dames.[25] In fact, it seems that during the hydrologic summer, navigation is easy only in the wide and deep slackwater reaches separating the gravel bars, such as are found upstream from Huy.[26] All the difficulties encountered during the period of low water create significant delays for the traffic on the Meuse.[27]

During the period of high water, i.e., from November/December to February/March, the slope and the discharge tend to be steady. There is abundant water everywhere, and it is never necessary to make the towhorses enter the water beside the channel in order to guarantee towing power.[28] But other obstacles and dangers arise, particularly the appearance of irregular currents and of rapids. The flow becomes so powerful that the descent is made perilous and the ascent is made difficult, or even impossible, when for example the towpath is submerged. At times there can be from 1.8 up to 2.4 meters of water, as in front of Marche-les-Dames.[29] The current may drive the boats onto the rocks hidden under the water.[30] When the flood reaches certain reference marks, the boatsmen announce that the Meuse is not navigable. This causes almost complete unemployment on the river craft.[31]

In fact, the best conditions for navigation can be found in mean-waters. During spring and winter the flow has a uniform speed almost everywhere. Water remains plentiful in the navigable channel, even reaching the level of the gravel-bars: there is in fact a depth of at least 0.9 up to 1.1 m.[32] Finally, the ascent becomes less difficult than during low or high water, even though some problems remain.[33]

It must be added that most of the traffic on the river Meuse occurs during these periods, that is to say in spring and in winter, when the water is neither too high nor too low.[34]

* * *

The degree of navigability can thus be very different according to place and season. The seasonal variations of the discharge of the Meuse are very important: the boats run the risk of being wrecked in winter and of running aground in low water. Frost, drought and flood, but most often excessively high water, cause unemployment on the river craft. There is most activity when mean waters is at average height, in spring and autumn and when navigability is at its easiest. Even then it remains important to have an intimate knowledge of the particularities of each difficult section and of each dangerous current.

The Boats

The main features of the boats are obviously determined by the conditions of navigation. The restricted width and shallowness of the navigable channel, and the presense of gravel bars require long, narrow flat-bottomed boats with shallow draught and sloping bow and stern. I will first provide some notes towards a description of the crafts and of small boats and towards the development of the Meuse vessels up to the XVIIth century. I will then move on to a more detailed examination of the component elements and the

24. Marche-les-Dames: Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 5705, 7 January 1661; Flône (5 m wide) and Namur (0.5 to 0.6 m deep): H. Guillery, *La Meuse . . . .*, p. 12 and M. Suttor, op. cit., annex 2.

25. Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 5705, 7 January 1661.

26. From the confluence of the Méhaigne to Huy, the water can be from 5 to 6 m deep: H. Guillery, op. cit., p. 12 and M. Suttor, op. cit., annex 2.

27. Philippe de Hurges, *Voyage de Philippe de Hurges à Liège et à Maastricht en 1615* (ed. H. Michelant (Liège, 1872) (*Soc. des bibliophiles liégeois*)), p. 252. See also M. Suttor, op. cit., pp. 53-55.

28. Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 5705, 9 January 1662.

29. Ibid., evidences of 4 and 5 January 1661; see also M. Suttor, op. cit., pp. 55-56.

30. Ibid., evidence of 4 January 1661.

31. Liège, Archives de l'Etat, *Notaire F. Rouveroy*, 1645, fol. 7 (deed of 22 August 1645).

32. H. Guillery, *La Meuse . . . .*, p. 10.

33. M. Suttor, op. cit., p. 57.

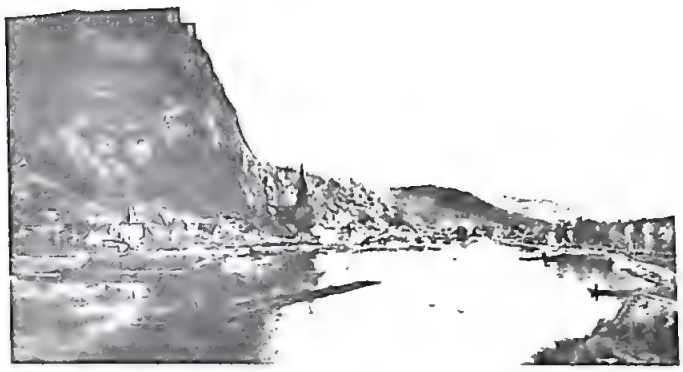
34. Ibid., p. 57, n. 136.

Streamlined prows of a *mignole*. Liège, about 1880. Tapestry.

mode of construction of the Meuse boats built during the XVIIth and XVIIIth centuries.

The documentation enabling us to study the boats mostly relies on deeds signed by notaries—unpublished sources preserved in the archives—and on visual evidence—paintings, engravings, and so on. XVIth, XVIIth and XVIIIth century notarial archives contain a great number of sale contracts as well as contracts dealing with the construction of boats; the rich terminology used there and the measurements given make it possible for us to reconstruct the Meuse boats with great precision.[35] The visual sources enable us to

35. The names given to the different kinds of vessels as well as to their constituent parts raise problems which are sometimes difficult to solve. Only a close analysis of the features of each part of the vessel and a careful examination of their uses can help us to clarify the terminology. For the vocabulary of river craft, see A. Jal, *Glossaire nautique. Répertoire polyglotte de termes de marine anciens et modernes* (Paris, 1848), currently being reedited, and the glossary published in M. Suttor, op. cit., annex 5, pp. 139-149.



Floating of rafts. Dinant, 1870. Painting by Boulenger.

visualize the vessels.[36] Yet, caution remains necessary: a painter or an engraver is first of all an artist and can never be considered as a photographer reproducing reality.

* * *

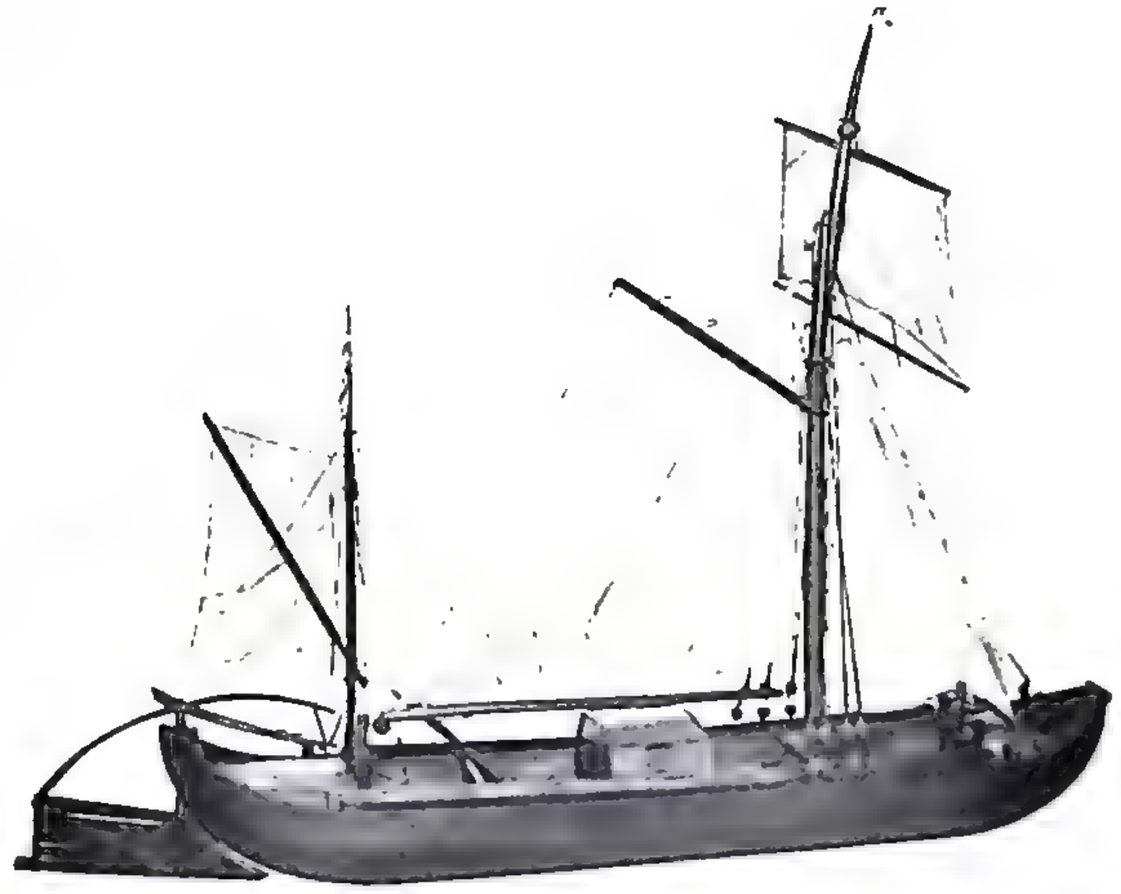
From the smallest to the largest, the crafts and small boats travelling on the river—*nacelles*, *pascheppes*, *pontons* and *nacques*—are used for various purposes, such as fishing, transporting of various goods, extra units in trains of boats, craft used for the loading and unloading of people and cargo at the landing stages, and so on.[37] The term *baches* always refers to ferryboats. Measuring from 15 to 18 m long and from 2 to 2.7 m wide, they are the largest of the Meuse small boats. Because of their particular use, they are proportionally wider than any other type of Meuse vessel: when crossing almost at right angles to the current, the stability of the ferryboat is increased. This craft is for carrying about ten passengers, sometimes with a horse or a cart.[38] The basic structure of all these small boats is identical to that of the large boats dealt with below.

36. It would be interesting to establish a corpus of the visual sources for life on the river: we only have fragmentary local information. See more particularly the *Paysages mosans du XVIe siècle. Le quai sur Meuse à Liège en 1553. La Meuse à Leuth en 1561. La terre libre de Leuth* (ed. E. Poncelet (Liège, 1939) (*Soc. des bibliophiles liégeois*)), *Atlas*; the drawings by Philippe de Hurges, *Voyage de Philippe de Hurges . . .* ; see also M. Suttor, op. cit., p. 63, n. 153 and annex 6, pp. 151-160.

37. See ibid., p. 65-71.

38. See a contract for construction of a *bache* in 1683 (Liège, Archives de l'Etat, *Abbaye du Val-Saint-Lambert*, reg. 221, fol. 134), as well as M. Suttor, op. cit., pp. 71-74.

Boats fitted with new rudder. Liège, 1838. Engraving by T.S. Boys.



Mignole, about 1835. Mock-up made by a boatman.

They do not have a deck, or rigging, or rudder. Furthermore, their equipment is reduced to essentials (ropes and boat hooks).

The probable ancestor of Meuse vessels was recently discovered in Pommeroeul—in the neighbourhood of the river Haine not far from the French border. It is a IInd century AD Roman barge, a flat-bottomed boat meant only for inland navigation; its principles of construction are akin to those that subsequently appeared along the Meuse.[39] This barge is an important clue; it provides evidence on the period up to the beginning of the XVIth century, when evidence becomes more abundant, enabling us to describe the Meuse vessels.

XVIth century vessels were about 30 m long, with a capacity of between 65 and 90 tons. The planks are held in position by beams. The flat bottom was secured to the planking by arched pieces of wood.[40] The ends of these vessels were of two distinct kinds—either streamlined and with a pointed tip, or in the shape of a trapezium. But in each case the prow and the stern are identical and are acutely elevated. The planks are carvel-built, edge to edge. The boats each had a single mast, which was held at the gunnels by shrouds; it was located in the front quarter of the vessel. Two forms of rigging were used on such vessels. One had a square or rectangular sail held taut by an angled spar. The sail was laced along the mast and it could be adjusted to take advantage of the wind by a set of ropes. The other consisted in a yard put crosswise near the top of the mast. The sail was attached to the yard by its upper part, and the lower ends were connected by cables to a small mast located at the stern of the boat, which made is possible to manoeuvre the whole. There are also two types of rudders. The more rudimentary, and probably more ancient rudder consisted in a large oar inclined at 45 degrees and put over the starboard side or at the stern of the vessel. The other consisted of a straight slanting tiller and an almost rectangular rudder blade.[41] The boats were also equipped with a cabin, various ropes, hooks, raising planks and an anchor.[42]

Among the main types of vessels to be found on the river in the XVIIth and XVIIIth centuries were the *bizawe*. Probably rather modest—perhaps from 20 to

39. G. De Boe et F. Hubert, *Une installation portuaire d'époque romaine à Pommeroeul* (Brussels, 1977) (*Archaeologia belgica*, no. CXCII); the vessel belongs to the assembled monoxyle type: see E. Rieth, "La construction navale à fond plat en Europe de l'Ouest," *Ethnologie française*, XI[1] (1981), 56-58.

40. Evaluation based on a contract for construction of a *ponton* in 1421 (Namur, Archives de l'Etat, *Haute cour de Namur*, reg. 17, fol. 402 v°) and on the measurements given by J. L. Meulleners, "De scheepvaart in het tegenwoordig hertogdom Limburg, tijdens de beroerten in de XVIde en XVIIde eeuw, benevens bijzonderheden uit dat tijdperk over Maasschippers handel, zeden, en rechtswezen in dit gewest," *Publ. de la Soc. historique et archéologique du Limbourg à Ruremonde*, XXIII (1886), 91.

41. This description is mostly based on two series of very valuable visual documents, i.e., drawings made in the middle of the XVIth century during the trials in Liège and in Leuth—on the Meuse, in Belgian Limburg; see the ed. by E. Poncelet, *Paysages mosans . . . , Atlas*, as well as M. Suttor, op. cit., n. 159 and n.406.

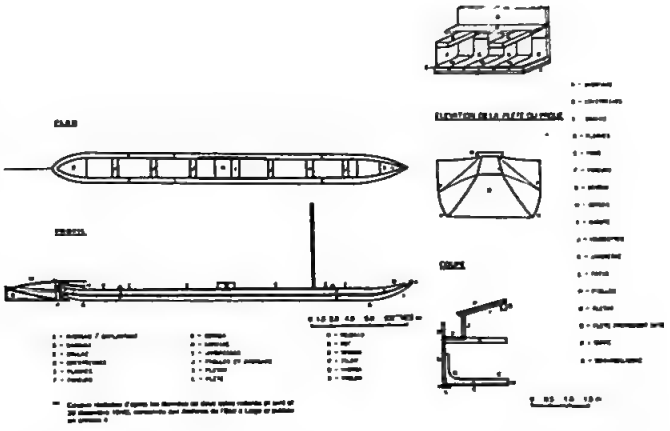
42. Liège, Archives de l'Etat, *Echevins de Liège. Obligations*, reg. 100, fol. 89 v°.

30 m long—this boat provided a regular link between the various towns on the Meuse. These *barque marchande* carried travellers and their luggage as well as goods. Philippe de Hurges, an alderman of Tournai, has left a brief but valuable description of a journey from Liège to Maastricht which he made on one of them. The vessel, rigged with a crosswise yard was fitted with a rudder-oar and had two cabins with windows.[43]

During the XVIIth and XVIIIth centuries, *pascheppes, nacelles, hernas* and *mignoles* were the most common vessels. Their general features were very similar, but the peculiarities of each must be pinpointed before enumerating their shared characteristics.

The difference between *pascheppes* and *nacelles*, on the one hand, and *hernas* and *mignoles* seems to be found in the shape of their rudders. The former boats preserved the stern oar of XVIth century vessels, whereas *hernas* and *mignoles* were fitted with a much more advanced rudder with a quite specific suspension mode. The tiller was made up of a strong piece of wood with a curved and concave profile. At the level of the gunwale it was encircled by two long wooden pieces of lath—the *reudaix*—which supported the edge of the long rectangular rudder blade. The end of the lath and the front of the bar were joined by strong ropes. Finally, the tiller fitted onto a pivot—the *tilff*—joined to the stern which supported the little front edge of the rudder blade. From the middle of the XVIIIth century onwards, all the Meuse boats were fitted with this kind of rudder. It must also be noted that the difference between *herna* and *mignole* is to be found in the shape of their prows and sterns. The types of ends that appeared in the XVIth century have been preserved. Streamlined prows and sterns are characteristic of the *mignole* and trapezoidal ends are characteristic of the *herna*.[44]

We shall now examine the features common to all these vessels. They varied considerably in size: from 22 m long, 1.75 wide and 0.9 high for the smallest, to 46.5 m long, 4.5 wide and 1.8 high for the largest. But these last measurements are a maximum for the flat-bottomed boats: larger hulls of this type could not withstand the impact of the tidal swell, which can be felt on the river downstream from Lith, in Dutch Brabant, a town frequently visited by Meuse boatmen.[45] The estimated loading capacity of these Meuse vessels was 25 tons for the smallest, and 250 tons for the largest, that is to say a ratio of one to ten.



Section and profile representation of a *pascheppe*, 1645. Realized by M. Suttor.

The basic structure of these boats was an interactive couple made of a transversal inner framework and a longitudinal outer structure. The former constituted the ribs of the vessel, the latter made up the flat bottom and sides. Large beams—the *pielles*—strengthened the rigidity of the flat bottom and angled pieces of wood—the *genoux*—were inserted between the *pielles*, assuring cohesion between the flat bottom and the side planking. On the outside, the *gergea*, a rabbet, made the connection between the planking of the sides and the flat bottom, which was made up of carvel-built planks, i,e., edge to edge, very carefully caulked. Finally, *palirez* or *avergans* kept the sides perfectly vertical; one of them supported the mast. Some secondary elements of the structure were not without interest. Planks, the *donnes*, covered the ribs and supported the gunwale, along which went a *waterbord* holding up the framework of the hatch panels. The *violon*, a piece of wood incorporated into the stern, held the pivot of the rudder. The accessories and equipment necessary for the manoeuvring and transportation of the freight could be put in place thanks to this secondary structure. Because of gunwales or *jambresses* boatmen could for instance move the length of the vessels in order to manoeuvre. Mooring posts, the

43. Philippe de Hurges, *Voyage de Philippe de Hurges . . . .*, pp. 129-130.

44. M. Suttor, *La navigation . . . .*, p. 85 and pp. 89-91.

45. See E. Rieth, "La construction navale à fond plat . . . ," 56 as well as P. Celerier, *Les navires* (Paris, 1966) (Coll. *Que Sais-Je?*, no. CDXI), 33-34 and 41.

Building of a boat. Namur, 1838. Engraving by L. Hagne.

boulaz, were fixed to these gunwales and used to tie up the boats. The boats had a deck at the prow and at the stern, and were double-bottomed to hold the cargo. The freight was packed into compartments called *heuscottes*, and the loading hole was covered by a hatch. Movable planks, the *flaxhes*, were used to raise up the planking. It must be added that the boatmen had cabins, *rots*, which were in fact rudely fitted out shelters most often located at the rear of the vessel. Compared with the XVIth century, few changes can be noticed in the rigging. The boats were fitted out with a second mast which replaced the small mast of the vessels of the preceding century. The main mast, which used to be taken down at bridges and at landing stage, was now articulated and moved on a pivot. Lastly, additional sails, among them a jib at the front, favoured running before the wind. We should also mention some tackle for manoeuvring, lifting, stowing and mooring: numerous ropes, boat hooks, pulleys, hoists and capstans, planking raises, as well as two or three anchors.[46]

Some words should be added on the manner in which such boats were built. First of all the flat bottom was laid down, onto it the *gergeas* were then fastened. The planks of the prow and of the stern, slightly rounded by fire bending, were then put in place and shaped. The transverse framework, *genoux* and then the *pielles*, were nailed down or pegged onto the flat bottom. The planking of the sides was fixed onto the ribs with the help of pegs for the parts under water, and with the help of nails for the upper parts. The secondary structure and the accessories, the rigging, then the rudder and the various items of tackle, were then fixed. The final phase before launching was very important. Made with vegetable tar, or *daguet*, and tarred tow, caulking was absolutely essential to make this edge to edge type of assembly watertight. In fact caulking had to be carried out every year.[47]

* * *

Such were the boats and vessels to be found in days gone by on the river. Long and streamlined, with shallow draught and elevated ends, their basic structure relied on a solid crossed assembly of the outer structure of the planking and on an inner framework secured by strong ribs. They were thus totally different from Scandinavian boats in which planking played an active part in the structure, and of the Mediterranean boats, in which the keel and the framework performed the same purpose.[48] This flat-bottom structure seems to be peculiar to western Europe. Its advantages were that it was solid, easily made, inexpensive, had a swallow draught and it could be beached. On the other hand, it had certain limitations: a structure which permitted limited variations, maximum measurements thresholds that could not be overstepped, and restricted navigational capacity.[49] Such boats could not for instance cope with the tidal swell met with on the Lower Meuse in the neighbourhood of Lith in Dutch Brabant.[50]

46. About two hundred deeds transcribed on the occasion of the construction and sale of vessels give us very precise descriptions: see M. Suttor, *La navigation . . .*, p. 6, n. 145.

47. On the construction of vessels, see G. Cuisenaire, *Leçons—Promenades* (*Contribution à l'étude et au développement du programme*). *Quatrième promenade-leçon. Visite du chantier de réparation et construction de bateaux* (*Chantiers de l'Union Batelière à Thuin*) (2nd ed., Tamines, 1936), pp. 58-60.

48. E. Rieth, "La construction navale à fond plat . . . ," 47, 52, 54 and table 1, fig. 8-9, particularly 58-60 clarifying and correcting the distinctions made by P. Heinsius, *Das Schiff der hansischen Frühzeit* (Weimar, 1956) (*Quellen und Darstellungen zur hansischen Geschichte*, neue Folge, t.XII), 35-55; concerning the concepts of framework and of planking, active or passive, see L. Basch, "Ancient Wrecks and the Archaeology of Ships," *The International Journal of Nautical Archaeology and Underwater Exploration*, I (1972), 17-19.

49. E. Rieth, op. cit., 55-56 and 60; M. Suttor, op. cit., p. 105.

50. E. Rieth, op. cit., 56 and M. Suttor, op. cit., p. 105-106. — The coefficient of proportion of the 1421 boat (n. 40): 11,1/1 seems very close to that of later vessels, between 12/1 and 13,7/1, which appears to correspond to the maximum possible development of a flat-bottom structure (see ibid., p. 92 and n. 289). This threshold can

Liège, 1553. Anonymous drawing. See above, n.41.

But their qualities and defects correspond to the navigability of the Meuse and such vessels preserved their essential features. Only slow developments can be observed, and these affected details of minor significance.[51]

Navigation

It would be presumptuous to speak of "navigation techniques." What the Meuse boatmen were doing in fact was following codes of practice derived from practical experience and perfected by experience over many decades. We are going to examine the way in which the *naiveurs* used their working tool, i.e., the boat which had been shaped by the river, in order to get the most out of it. The navigational problems encountered by vessels at low water and high water or due to the state of the area around the river will also have to be illustrated. Finally, I will make some observations about what has been called the "river craft stages."

The historian's traditional documentary sources will be used here: narrative sources (annalists' reports and chroniclers' accounts, travellers' tales, and so on) and diplomatic documents (sources which include day-to-day administrative material, court records and commercial reports). Iconography will also be of help in reconstructing the "navigation techniques."[52]

* * *

The Meuse crafts did not have rudders. They were manoeuvred with the help of boat hooks and paddles: with the former the boatman at the prow could avoid rocks and propel the small boat, with the latter, fixed at the stern, a course could be steered. The elevated ends facilitated the crossing of currents and gravel bars. Manoeuvring the ferryboats seems to have been more difficult. Because they crossed almost at right angles to the flow of the river, the boatmen had to ensure that they were not swept away by the current. Finally, when travelling upstream, small units were often towed by the large boats, thus forming a *coppliée*.

A crew of two or three men was necessary on the Meuse vessels. One boatman stood at the prow and used a boat hook to fend the boat off from rocks and gravel banks. Another, at the rudder, steered the vessel. When moving upstream, a third was busy with the towhorses.[53] Sometimes men pulled the vessels, but horses, harnessed one behind the other, were more

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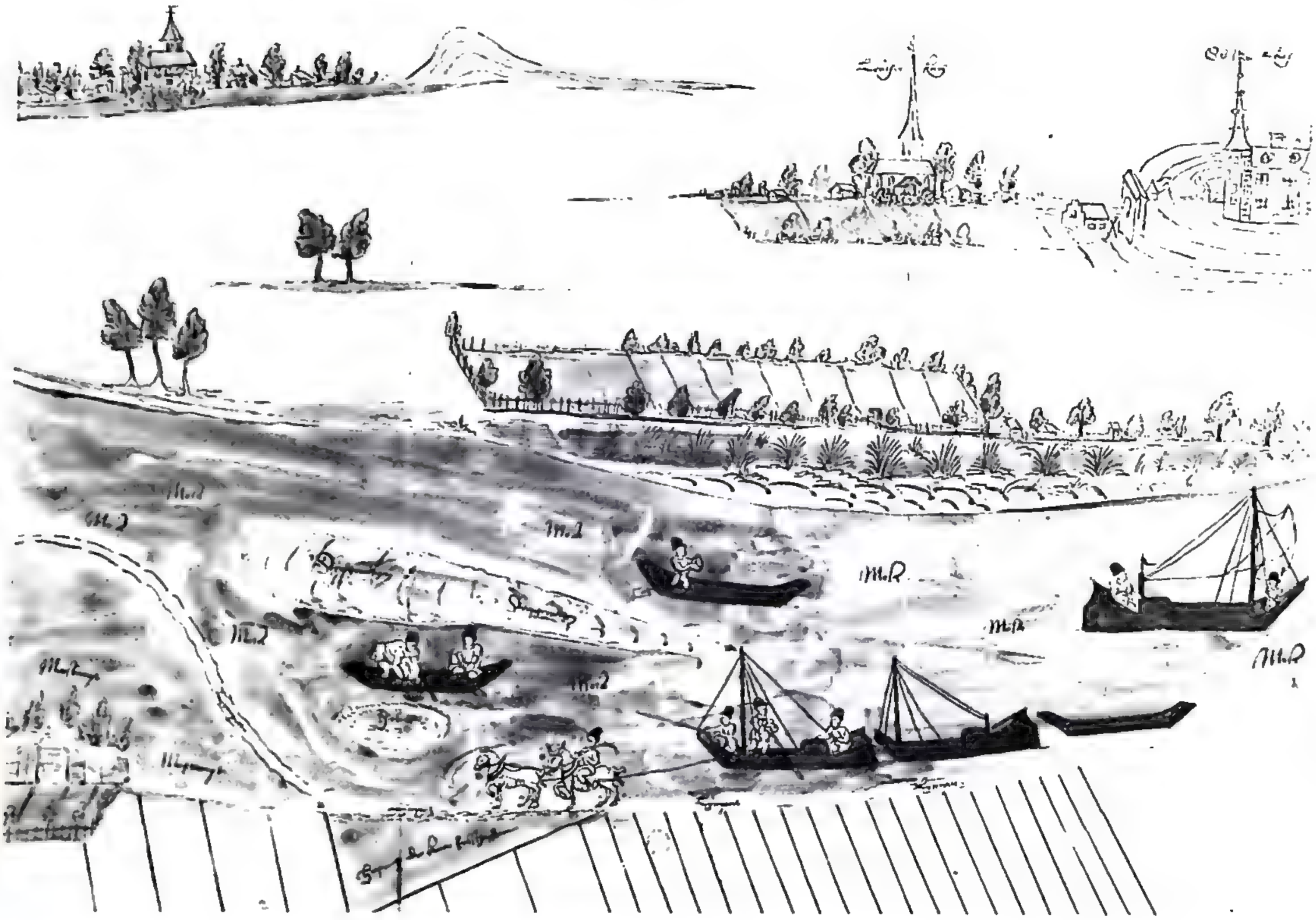
nevertheless be lower on a river, because there the stress on the hull is less than on the sea. It is also interesting to compare the length of the 1421 boat, about 30 m, with the 23,23 m of a *cogue*/hull dating back to 1380 (measurement close to the maximum threshold for a flat-bottomed vessel meant for sea navigation: E. Rieth, op. cit., 56 and *The Hanse Cog of 1380* (ed. K.-P. Kiedel and U. Schnall (Bremerhaven, 1985) (*Förderverein Deutsches Schiffahrtsmuseum Bremerhaven*), p. 10).

51. Concerning XIXth and XXth century-boats, see P. Questienne, *La navigation en Wallonie. Catalogue de l'exposition organisée au Musée de la Vie Wallonne à Liège du 16 mars au 18 juin 1978* (Liège, 1978), pp. 17-21.

52. See the drawings of the Leuth and Liège trials in the middle of the XVIth century, and their annotations, as well as the visual sources quoted by M. Suttor, op. cit.

53. Drawings of Leuth (nos. I to IV) and of Liège (no. I); view of Namur in 1575 (ed. *Annales de la Soc. archéologique de Namur*, II (1851), plate opposite 332).



Leuth, 1561. Anonymous drawing. See above. n.41.

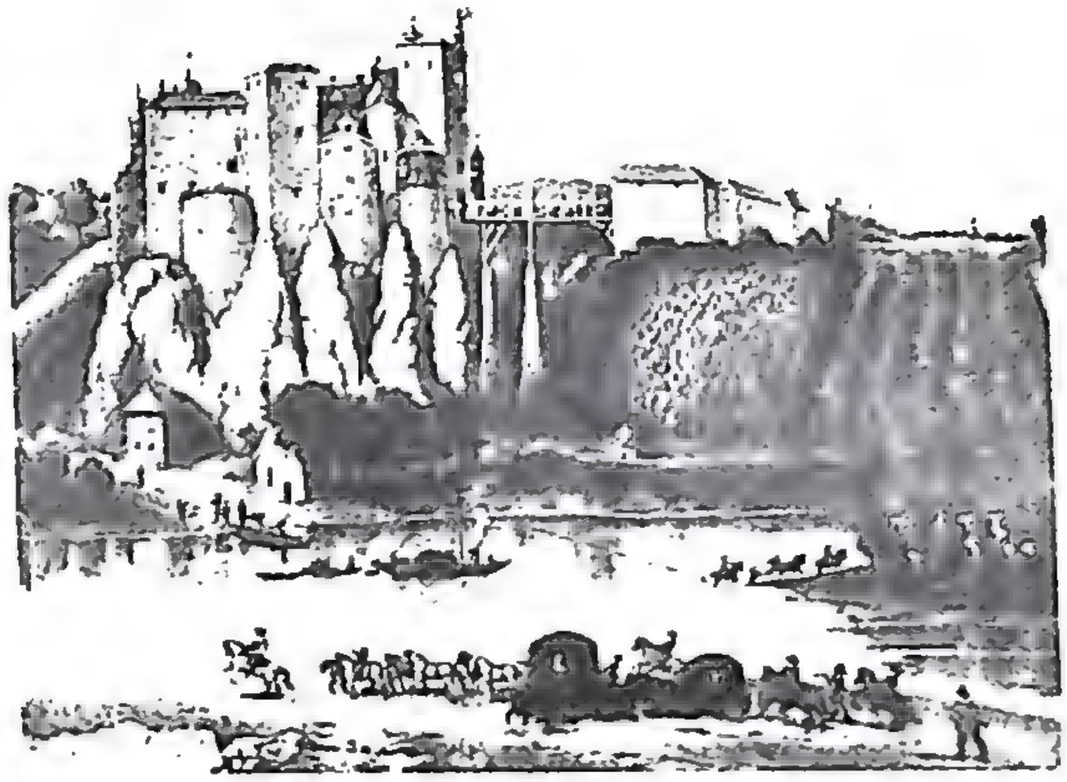
often used.[54] There could be from one to four horses depending on the size of the boat, the importance of the cargo and the strength of the current.[55] The harness was fastened to the horse by shoulder collar, and towing cable to the vessel in three different ways: either to a mooring post placed on the front gunwale, or to a *maslotte*—a strop connecting the mast rigging halfway up, or to the top of the mast.[56] Going downstream, the horses were taken on board, and the sail set in back sailing trim so as to take advantage of the prevailing south-western wind, was hoisted as often as

54. Towing is mentioned for the first time at the end of the XIIIth century: D. D. Brouwers, *L'administration et les finances du comté de Namur du XIIIe au XVe siècle*, II, *Chartes et règlements* (Namur, 1914), II, 192. Towing by men is mentioned in a deed of [12] December 1317: O. J. Thimister, *Cartulaire ou recueil de chartes et documents inédits de l'église collégiale de Saint-Paul, actuellement cathédrale de Liège* (Liège, 1878), p. 144. The two modes of towing can be seen in a picture of Huy by H. van Cleve (1612) (ed. A. Joris, *Le visage de Huy. Choix et commentaire de documents anciens. XVe-XIXe siècle* (Brussels, 1976) (*Crédit communal de Belgique*. Coll. *Histoire Pro Civitate*, série in-4°, no. VI)).

55. One horse: view of Namur in 1575; two horses: drawings of Leuth, nos. II and III; three horses: sketch of Liège, nos. I and II. The horses are following each other at a distance of less than two meters: Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 4863, 29 December 1646.

56. Towing cable fixed at a mooring post: Liège, Archives de l'Etat, *Notaire H. Henry*, 1628-1630, deed of 20 November 1630; at a strop: engraving of Milheuser representing Liège in 1649 (ed. E. Wahle, *Liège dans la gravure ancienne et moderne* (Liège, 1974), cover); top of the mast: view of Namur in 1575 and map of the region downstream from Roermond (1591): Maastricht, Rijksarchief in Limburg, *Atlassen en kaarten*, 645. S. Lebecq, *Marchands et navigateurs frisons du haut moyen âge*, I, *Essai* (Lille, 1983), fig. 50 and pp. 220-221 writes that in order to have a balance between the force of traction and the propelling effect the best place to fix the tow-line seems to be between the prow and the middle of the boat.

Two modes of towing. Huy, 1612. Engraving by H. van Cleve. See above, n.54.



Towing cable fastened to the vessel by a *maslotte*. Argenteau, before 1674. Anonymous engraving.

possible.[57] It should be noted that it was very difficult for vessels going in different directions to pass one another where the channel was narrow. The boatmen going downstream generally had right of way, except when a towed boat going upstream was in one of these dangerous currents.[58] Finally, because of their flat-bottom structure, the Meuse vessels can often run aground.[59] Ascent and descent were made in such a way when navigation conditions were at their best.

At some times of the year the discharge of the water and the state of the land near the river created difficulties, caused delays and made navigation dangerous.

During low water, it was important to remain in the navigable channel. It took more than six hours, instead of the normal three or four, to cover the thirty or so kilometers between Liège and Maastricht. Sometimes it was necessary to use towhorses going downstream over the gravel bars.[60] It was also sometimes necessary to unload the main vessel and to divide up its cargo onto smaller boats.[61] At high water the descent became very rapid. The rocks had to be avoided and it was necessary to be very careful not to be swept away by the currents, as thus would mean losing control of the rudder.[62] The major difficulties, however, arose going upstream. The number of draught horses had to be increased[63] and, with the towpaths becoming impassable or the current too strong, it sometimes happened that all traffic on the Meuse stopped.[64]

Bridges should be mentioned among the obstacles encountered on the river. Movement both up and downstream was hampered by them, because they forced boatmen to take down the masts.[65] Going downstream the boats were in danger of hitting the arches of the bridges. Going upsteam the state of the towpath also created difficulties: sometimes non-existent, the path was very often obstructed and poorly

57. See M. Suttor, *La navigation sur la Meuse . . .*, p. 110, n. 379 and p. 111, n. 380. A square or rectangular single sail toward the prow certainly corresponds to this mode of navigation: S. Lebecq, op. cit., p. 174.

58. A. Baguette, *Le paweilhar Giffou. Edition critique* (Liège, 1946) (*Commission communale de l'histoire de l'ancien pays de Liège, Documents et mémoires sur le pays de Liège*, fasc. I), 77-78, art. 283 and *Chartes et privilèges des bons métiers de Liège* (w.p.n.d. [XVIIIe s.]), II, 5, art. 24 (deed of 6 July 1587).

59. Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 4863, 14 February 1646 and inquiry no. 5705, 5 January 1661.

60. Philippe de Hurges, *Voyage de Philippe de Hurges . . .*, pp. 130-131, pp. 229-230 and p. 252.

61. The *Chronique du règne de Jean de Hornes* (ed. S. Balau (*Chroniques liégeoises . . .*, I)), 485, no. 248 (May 1493); *Chartes et privilèges des bons métiers de Liège . . .* (w.p.n.d. [XVIIIe s.]), I, 205 (deed of 23 July 1626).

62. Philippe de Hurges, *Voyage . . .*, p. 127 and Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 5705, evidence of January 1661.

63. Liège, Archives de L'Etat, *Chambre des comptes, Parchemins*, no. 64 (1612-1650).

64. Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 5705, evidences of 4 and 5 January 1661; Liège, Archives de l'Etat, *Notaire F. Rouveroy*, 1645, fol. 7 (deed of 22 August 1645).

65. Sketch of Liège, no. II; see also M. Suttor, *La navigation . . .*, p. 99, n. 325 as well as p. 114, n. 396 and n. 398. A towpath is rarely cut under the arches of the bridges; when going upstream the horses have to tow against the current (ibid., p. 114, n. 397).

Towing of a *coppliée*. Namur, 1575. Anonymous engraving. See above, nn.55-56.

maintained.[66] Sometimes it was on the bank opposite the navigable channel, sometimes it switched from one bank to the other, and when there was no ford the draught horses had to be transferred on a ferryboat.[67] Finally, the smooth ascent of the vessels was disrupted and made dangerous by floating logs. The river Meuse was indeed a very important "log road."[68] The transportation of this basic material, a large part from the Ardennes, was effected by two methods: the floating of single logs and the floating of trunks tied together in rafts. Inevitably, the boatmen were severely inconvenienced by the descent of such rafts, especially since most were floated down during the spring, a time when the traffic on the river was most intense.[69] One more peculiarity of navigation on the Meuse deserves to be mentioned: the trains of boats, usually composed of a main vessel followed by a small boat and by a smaller craft. Manoeuvring such trains, mostly brought together to travel upstream, proved very difficult.[70]

Finally, it seems to us that the notion of "river craft stage" should be made clearer. If the navigation conditions were favourable, going downstream the same journey could be made twice as fast as going upstream. It took a little more than two hours at high water, three or four hours at mean water and over six hours at low water to go from Liège to Maastricht.[71] Hence, the distance of roughly thirty km between each town on the Meuse, often presented as equivalent to one-day's journey, does not correspond to any navigation "measurement unit."[72] In fact, the "river craft stage" should be expressed in terms of duration, and not in terms of distance. Even if Dinant, Namur, Huy, Liège and Maastricht were in fact stopping places for water transportation, none of these towns was a compulsory stopping place for boatmen, who often stopped halfway between towns. The stopping place was always determined by the navigation conditions.[73]

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Such were the techniques, or rather pragmatic rules of thumb, used by boatmen to make the most of the Meuse vessels, first of all taking into account the characteristics of the river and its limitations, but also taking into account the problems created by the areas around it.

Conclusions

The river Meuse proves to be capricious and to offer a navigable channel which was often narrow and shallow, affected by numerous gravel banks and multiple currents. Its navigability turned out to be very variable, changing from one place to another and one season to another. Mean-waters offered the best navigation conditions.

66. Namur, Archives de L'Etat, *Conseil de Namur*, inquiry no. 4863, 22 February 1646; Namur, Archives de l'Etat, *Métiers de Namur*, reg. 20 (2nd half of the XVIth century); Liège, Archives de l'Etat, *Chambre des comptes, Parchemins*, no. 64 (undated deed; (12 May 1612–1649)); see also M. Suttor, op. cit., p. 115, n. 399.

67. Namur, Archives de l'Etat, *Conseil de Namur*, inquiry no. 5705, 9 January 1662, M. Suttor, op. cit., annex 2 and p. 71, n. 195.

68. M.-L. Fanchamps, "Transport et commerce du bois sur la Meuse au moyen âge," *Le Moyen Age*, LXXII (1966), 59-62.

69. See M. Suttor, *La navigation* . . . , pp. 119-121; the most interesting description concerning rafts is that of Philippe de Hurges, *Voyage* . . . , pp. 126-128.

70. M. Suttor, op. cit., pp. 118-119; composition of the trains of boats: drawing of Leuth, no. III, and view of Namur in 1575; formation to go upstream: Bruxelles, Archives générales du Royaume, *Chambre des comptes*, reg. 1004, fol. 58 and fol. 72 (deed of the 1st half of the XVIth century) and Huy, Archives de l'Etat, *Ville de Huy*, reg. 362, fol. 7 (deed of 23 December 1611).

71. Philippe de Hurges, *Voyage* . . . p. 227 and p. 252. S. Lebecq, *Marchands et navigateurs frisons* . . . , p. 222 actually records a time five times faster when going downstream than when going upstream.

72. On this point, see M. Suttor, op. cit., p. 122, n. 432.

73. M. L. Polain and S. Bormans, *Recueil des ordonnances de la principauté de Liège. Deuxième série (1507-1684)* (Brussels, 1872), III, 10 (deed of 5 April 1622).

The river's peculiarities shaped quite distinctive boats, with a simple and flexible but solid structure: a flat bottom and a shallow draught, a slender and streamlined shape, elevated ends. The solidity of this typical structure relied on a crossed assembling of the floor timber and of the strake.

Finally, boatmen on the Meuse evolved rules of thumb to get the best results from their boat given the nature of the river.

However, in spite of all the drawbacks noticed, river transportation provided conclusive advantages over land transportation; it was therefore preferred for numerous products, and particularly heavy or bulky goods. The slightest cost of the freight by water already seemed quite important, but the much higher capacity of a vessel over a cart seemed to prevail here. In the XVIIth century Vauban noted that "un bateau de raisonnable grandeur peut à lui seul, avec six hommes et six chevaux, mener la charge que 400 chevaux et 200 hommes auraient bien de la peine à mener par les chemins ordinaires."[74]

We have also noted that navigation and vessels changed little from the XVth to the XIXth century. We can almost speak of opposition to change. In fact, the permanency of the ancient types of boats corresponds with the immuability of the features of the Meuse and of its navigability before the major regulation and canalization works undertaken from 1853 onwards.[75] This accounts for the continuity of the construction processes and of the "navigation techniques." Such inertia can be seen as long as the means of transportation—the river—and the tool—the Meuse vessel—have been sufficient to satisfy the needs of an ancient régime trade. It was only in the XIXth century that an unprecedented economic expansion gave birth to commercial exchanges of a quite different nature. It was then necessary to meet the new requirements, i.e., the transformation of the infrastructure of transportation became an ever more urgent need and new types of boats appeared later on the river.[76]

A greater number of reports on river navigation would make it possible to check and perhaps to refine M. E. Rieth's hypothesis concerning the west European peculiarities of the "flat-bottomed" principle of construction. Valuable comparisons could then be made and, ultimately, a typology of flat-bottomed vessels could be worked out.

74. Quoted after P. Questienne, *La navigation en Wallonie . . .*, p. 11.

75. On these works, see ibid., pp. 57-60.

76. M. Suttor, op. cit., p. 128, n. 437 and p. 129, n. 438.

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An Old Fashioned Form of Protectionism: The Role Played by British Naval Power in China from 1860-1941

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AFTER failing to make a substantial commercial impact upon China during the previous two centuries, British merchants and businessmen finally began to secure a vital foothold in this vast and to a large extent untapped market in the early years of the nineteenth century by trading in Indian opium. Apologists for this seediest and most exploitative of commercial enterprises did not refrain from pointing out to their critics that they were merely fulfilling a service, almost as though drug addiction amongst a rapidly growing number of Chinese people had nothing to do with them. For years, however, those engaged in what ought to have been seen as a morally repugnant and indefensible trade 'pushed' the drug as hard as they could along the entire coastline of China and in doing so established an immensely lucrative business which transformed British trade in these waters. After being a net importer of Chinese goods for more than 180 years, Britain became a net exporter to the so-called 'Middle Kingdom' by the closing years of the 1820s. Opium was largely responsible for bringing about this remarkable transition in the terms of trade. As British penetration into the China market grew in the following years, so did its value to the government and the Treasury in London.[1]

Anyone with even a rudimentary knowledge of modern Chinese history recognizes the extent to which successive British governments were prepared to go during the Victorian era in supporting their businessmen in this part of the Orient. By 1860 three wars had been fought to sustain this development and the British commercial, diplomatic and military presence in China had become an established fact of life.[2]

Nonetheless, the ending of the third of these Anglo-Chinese wars in 1860 marked a watershed in relations between Her Majesty's Government and the imperial authorities in Peking. Thereafter under the benign influence of the Honourable Frederick Bruce, the British minister in China, the level of intense acrimony dropped and a new spirit of effective cooperation slowly began to prevail. Evidence of this more helpful attitude was seen in the months following the signing of the Conventions of Peking in October 1860, with growing British support for the imperial authorities in their gruelling struggle with the Taiping rebels. Abandoning the strict neutrality observed since the outbreak of this civil war nearly two decades before. the British military response became increasingly interventionist and sympathetic to the existing imperial government. While admittedly much of this change could be attributed to a pragmatic and mercenary desire to safeguard their trading and treaty privileges, the British also recognised that with the death of Emperor Haifeng in August 1861 and the reduction of much of the virulent xenophobia expressed by his court, the opportunity presented itself at last for some kind of Anglo-Chinese rapprochement.[3]

This possibility became a reality in the course of the next few years as military collaboration aimed at defeating the Taiping rebels helped to do just that by

1. By 1829 the value of British opium exports to China exceeded by over $2 million that of their imports of Chinese tea. By 1833 the gap between the two had risen yawningly to over $4¼ million. For further information on this trade see Peter Ward Fay, *The Opium War 1840-1842* (Chapel Hill, N.C., 1975), pp. 41-64; Hosea B. Morse, *The International Relations of the Chinese Empire vol. I* (London, 1910), pp. 90-1.

2. Morse, *International Relations, I*, pp. 209-40; 262-337; 400-37; 479-538; 571-617; Fay, *Opium War*, pp. 142-79; 213-355; Charles Remer, *The Foreign Trade of China* (Taipeh, 1967), pp. 16-8; 24-6; G. W. Keeton, *The Development of Extraterritoriality in China, vol. I.* (London, 1928), pp. 14-20; 40-1; 143-70; John Selby, *The Paper Dragon* (New York, 1968), pp. 46-87; Douglas Hurd, *The Arrow War* (New York, 1967), pp. 181-84; 189-241.

3. Grace Fox, *British Admirals and Chinese Pirates* (London. 1940), pp. 40-5; J. S. Gregory, *Great Britain and the Taipings* (London, 1969), pp. ix-169.

1864. In addition to the feats of General Staveley, Major Gordon and Admiral Hope in helping to subdue the rebel forces, the British were instrumental in establishing a maritime customs inspectorate as an effective vehicle for the collection of tariffs on all foreign trade with China. Apart from the legalisation of opium in 1858, the end of the third Anglo-Chinese War two years later and that of the Taiping Rebellion in 1864 provided the circumstances necessary for a growth in international trade. Under Robert Hart, the inspector general of the Chinese Customs from 1863 onwards, the service became an efficient arm of government. His pro-Chinese stance was much appreciated in Peking and his influence at court grew as time wore on. If not solely responsible for encouraging a more open attitude on the part of the imperial government, Hart did as much as anyone to get it to realise the importance of being represented in the capitals of the other treaty powers.[4]

It was in this atmosphere of improved Anglo-Chinese relations that Lord Clarendon, the British foreign secretary, proposed a major policy change towards China on 28 December 1868. He indicated that the British government did not wish to put any "unfriendly pressure" on China to increase the pace of the reform process and improve its relationship with foreign powers. Although dispensing with the 'big stick' approach, Clarendon made it clear that H.M.G. was far more interested in dealing with the central government in China than with any local or provincial authority.[5]

This new directive was to have a most profound effect upon British naval policy in Chinese waters. In the recent past, apart from their constructive role in the suppression of piracy along the coast, gunboats had been called upon quite regularly to apply direct coercive force against those elements which had not shrunk from acting against foreign missionaries, merchants and consular officials in the provinces. In such cases it was not unusual for these vessels to open fire or to land marines for some sortie ashore. Naturally enough, this type of armed belligerence had done nothing to endear the British to the Chinese people or lessen the latters' xenophobic reaction to the foreigners in their midst. While Clarendon's policy did not spell the end for gunboat diplomacy, *per se*, it did lead to a much greater control by the Admiralty over the use of naval force to support British mercantile and other interests in China. Whether coincidental or not, the new less assertive role of the navy had an almost immediate and beneficial effect upon Anglo-Chinese relations. This marked improvement also made possible a reduction in the number of H.M. ships in Chinese waters to one ironclad, four corvettes or sloops, sixteen gunboats, one troop ship and three other assorted vessels in the early months of 1869.[6]

Unfortunately, this new found spirit of cooperation did not do more than keep xenophobia at bay for a time, a fact which was evident in the Tientsin massacre of 1870, various anti-French incidents in the years thereafter and the murder in Yunnan province of A. R. Margary, a British consular interpreter from Peking, in February 1875. It was the circumstances of Margary's death which made it difficult for H.M.G. to ignore it.[7] In the months which followed the two sides once again flirted disconcertingly with the spectre of war before a settlement, the Convention of Chefoo, was reached between them on 13 September 1876. Sir Thomas Wade, the British plenipotentiary, ably supported by the intimidating presence at Talienwan of a British 'flying squadron' of four frigates, induced the Chinese government to make some recompense, including the opening of Ichang, Wuhu, Wenchow and Pakhoi as treaty ports with six other towns on the Yangtse designated as ports at which steamers would be allowed to call. Although the threat of force had again been in evidence, perhaps even because of it, this convention finally persuaded some members of the imperial court to realise that it was not in China's long term interests to be complacent and to dwell indefinitely upon the lustre of its glorious past, however strong the temptation might be to do so, but to accept that it had a role to perform in the modern international system. Arising out of the convention, therefore, China at last opened its first permanent legation in London in February 1877 and followed this with diplo-

4. "The Taiping Rebellion" by Philip A. Kuhn in Twitchett & Fairbanks (eds.), *The Cambridge History of China* vol. 10 (Cambridge, 1978), pp. 264-317; Selby, *Paper Dragon*, pp. 109-51; H. B. Morse, *The International Relations of the Chinese Empire, II* (Shanghai, 1918), pp. 25-63, 90-112, 138-62.

5. *The Times*, 19 February 1869; the background to this important declaration is dealt with in Frederick W. Williams, *Anson Burlingame and the First Chinese Mission to Foreign Powers* (New York, 1912), pp. 173-76; Fox, *British Admirals*, pp. 67-71.

6. Fox, *British Admirals*, p. 68.

7. Morse, *International Relations, II*, pp. 239-61; 283-306.

matic representation elsewhere in Europe, the United States and Japan in the following months.[8]

Thereafter peace brought important commercial benefits to both Britain and China. Far more ships than ever before came to do business in Chinese waters, a fact encouraged both by the opening of the Suez Canal in 1869 and the greater access these vessels now had to China's ports and inland waterways. British ships established an early dominance in this trade, accounting for roughly 63% of all tonnage in Chinese waters in 1883 and 65.6% ten years later.[9] In particular British merchants had tried with some success to exploit the vast potential of the Yangtse river and the basin which it drains, an area of some 750,000 square miles and with a population estimated in excess of 170 million. Shallow draught vessels were able to reach Chungking all the year round from Shanghai, a distance of 1,427 miles, while during the spring to autumn months of high water even ocean going ships could usually get up to Hankow some 595 miles from the sea. Shanghai at the mouth of the Yangtse rapidly became a crucial trading port for the British in their attempt to impose themselves upon the China trade. Its importance lay not only in its strategic location for the trade on the river but also as a distribution centre for the central and northern regions of the country.[10]

If trade was the main attraction for the British in their early relationship with China, a disturbing blend of strategic, military and imperialistic factors began to make their presence felt as the nineteenth century drew to a close. Much of the responsibility for this change came in the wake of China's comprehensive defeat in the Sino-Japanese War of 1894-5, a result which did much to underline and expose its more obvious limitations. After the punitive terms of the Treaty of Shimonoseki had been announced in April 1895, the major European powers recognised that they too could secure substantial advantages for themselves from such a weakened power.[11]

Once this idea was born, the 'Scramble for China' could not be long delayed. In the event Germany, Russia and France all wrung concessions from the Chinese in the form of territorial acquisitions, business ventures and other favours in the course of the next three years. Worried by the prospect of increasing foreign competition in the China trade, the British government sought to protect its dominant position by demanding equality of treatment with the other powers. It did not shrink, for instance, from despatching nine of its warships to Chemulpo in Korea on 7 December 1897 to shadow a Russian fleet of the same size that had supposedly anchored at the same port. This blatant show of force based, alas, on wrong information, seemed to indicate that the Russians were not alone in desiring a northern port from the enfeebled Chinese government. Unfortunately, the British naval demonstration, a source of acute embarrassment to Lord Salisbury's government, seems to have touched off a state of near panic in European capitals and may indeed have been partly responsible for convincing the Germans to hold onto Kiaochow and the Russians to remain in the market for Port Arthur. Thwarted on this score and that of a £12 million loan to the Chinese government, which the other powers opposed, the British Cabinet was finally bought off on 1 July 1898 with the lease of Wei-hai-wei, a port which had no great material value save that it could be retained for as long as Port Arthur remained in Russian hands.[12] If Wei-hai-wei was merely a pawn in the game, the British made some amends by reaffirming its special interest in the Yangtse valley and by negotiating an immensely important concession in the south, where a ninety nine year lease on the entire Kowloon peninsula from Deep Bay to Mirs Bay did much to enhance the already formidable reputation of Hong Kong in commercial circles by increasing its size and making it less vulnerable to attack.[13]

By plundering China in this way the foreign powers contributed to the imperial government's demoralisation and instability. They also reawakened the latent xenophobia which many Chinese nationalists needed little stimulus to express at the best of times. But these were not the best of times. A bewildering succession of poor harvests, disastrous floods, severe drought, and locust plagues combined to wreak such havoc in China's provinces that the bad omens were often de-

8. *Ibid.*, pp. 303-6; 313-5.

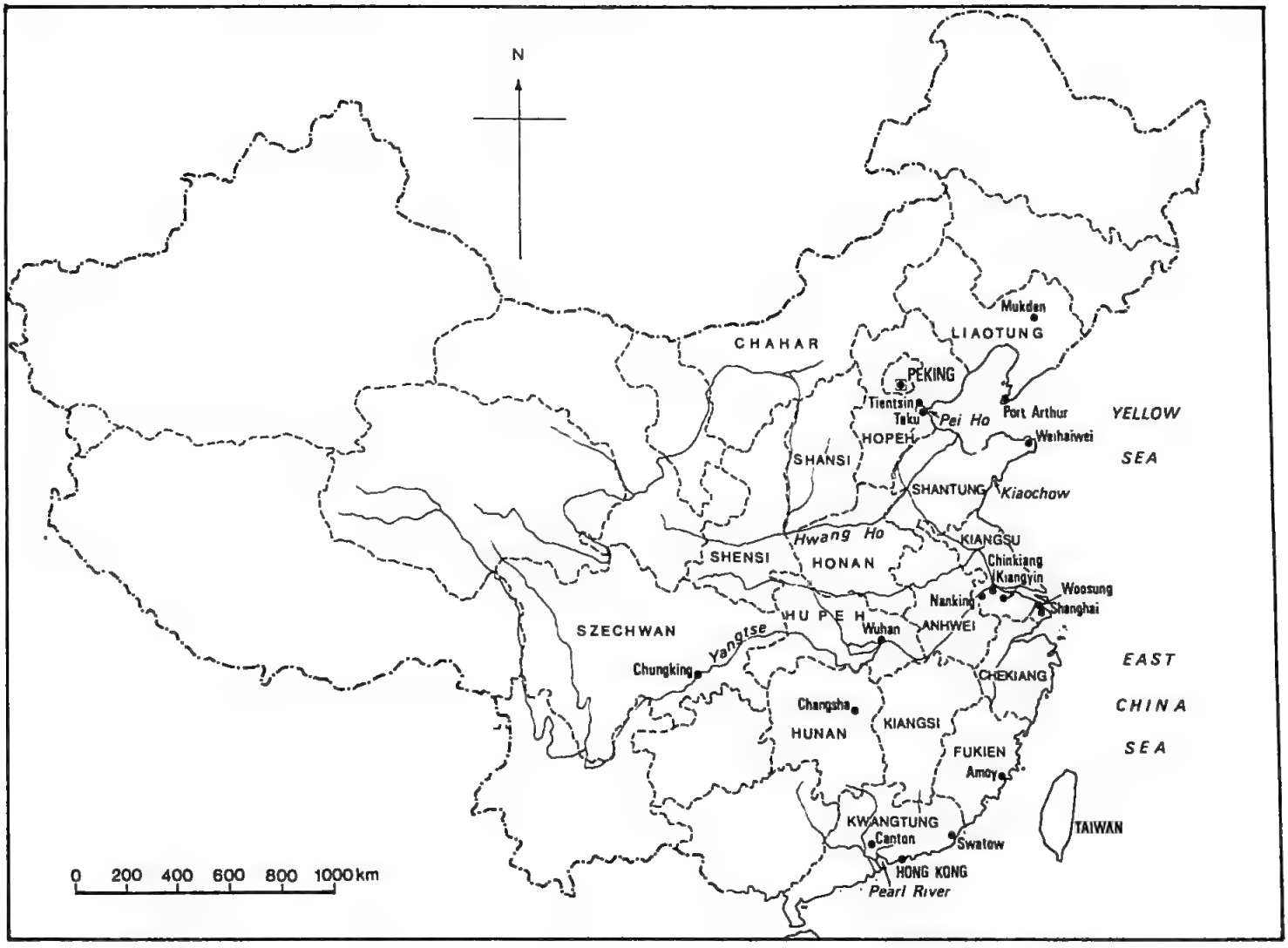
9. *Ibid.*, p. 395.

10. H. G. W. Woodhead, *The Yangtsze and its Problems* (Shanghai, 1931), pp. 1-2.

11. H. B. Morse, *The International Relations of the Chinese Empire, vol. III*, (London, 1918), pp. 18-56.

12. *Ibid.*, pp. 101-27; Leonard K. Young, *British Policy in China* (Oxford, 1970), pp. 1-99. For a brutal critique of Britain's gain from the 'scramble,' see John T. Pratt, *War and Politics in China* (London, 1943), pp. 13-14.

13. Morse, *International Relations, III*, pp. 119-20; Peter Wesley-Smith, *Unequal Treaty 1898-1997* (Oxford, 1984), pp. 21-44.



Map of China Coastline. Courtesy of History Department, National University, Singapore. Photo courtesy of the author.

picted as a running commentary on the emperor's conversion to the need for modernisation and the succession of reform decrees which had been promulgated by the court during a hectic 100 day period from June to September 1898. Once the empress dowager had removed the reformist emperor and reasserted her own conservative influence on the court, those movements which fed on anti-foreignism and a hatred of Christianity were tacitly encouraged. By far the most fearsome of these sects was that of the Fist of Patriotic Union, which the world was soon to know more widely as the Boxers.[14]

By early June 1900 the situation in many of China's provinces had become virtually anarchic. In wreaking a terrible vengeance on all their enemies, the Boxers' extremism had created a sense of justifiable alarm,

14. Morse, *International Relations, III*, pp. 128-92; Young, *British Policy*, pp. 100-19; Victor Purcell, *The Boxer Uprising* (Cambridge, 1963).

bordering upon panic, amongst the foreign community in China. This unnerving situation, where executions of Christians were commonplace and foreigners feared for their lives, had underlined the necessity for troop reinforcements to be moved up to Peking in order to guard the various international legations from the excesses of the militant xenophobes. As this plan failed to restrain the Boxers' from continuing to cause mayhem in the province of Chihli, the naval commanders of the great powers decided to take matters into their own hands. By 6:30 a.m. on 17 June they had seized the Taku forts at the mouth of the Peiho river after a short but violent struggle with the Chinese troops defending them.[15]

Within a matter of hours the foreign powers found themselves in a virtual state of war with the Chinese government. Although none of the major powers were disposed to see it as a war between themselves and the imperial government, all preferring instead to see the Boxers as their natural enemies, the fact remained that some of the more powerful members of the imperial court were considered to be sympathetic to the Boxers' cause. This much was made clear on 20 June when the foreign legations in the capital came under fire for the first time from troops of the imperial army and the infamous siege of Peking began. Elsewhere too the Boxers and imperial troops cooperated in their quest to exterminate foreigners and eliminate their doleful influence in China. A savage and bloody repression resulted with many examples of man's inhumanity to man being evident in the butchery which followed.

Britain, caught up in the morass of the Boer War in South Africa, was not in a position to drop everything and redeploy large forces in East Asia. Nonetheless this did not prove to be as great a handicap as might have been imagined beforehand because all the other leading foreign powers recognised that they had vested interests to protect in China and were, therefore, prepared to work together to bring the Boxer rebellion to an end. Collecting together some eight thousand American, British, French, Japanese and Russian troops, an international army eventually wrested the city of Tientsin from Chinese control on 14 July. After a nearly three week delay, during which the contingent of foreign troops in the city had risen to more than eighteen thousand, the international force left Tientsin on 5 August to begin its advance on Peking which was finally entered on 14 August 1900. Once the siege of the city had been raised, it was discovered that the imperial court had beaten a hasty and undignified retreat to Sianfu in Shensi province. Thereafter the foreign troops took their revenge upon Peking and its inhabitants in an unrestrained, ruthless orgy of pillage and destruction.[16]

Once the city had been duly sacked and the Boxers routed from the surrounding areas, the British government became anxious lest the allied powers should begin squabbling over the spoils of their victory in China. It was particularly concerned at what might happen to its predominant position in the Yangtse valley if China suffered an internal collapse or fell victim to dismemberment by the other powers. From the outset of the troubles Lord Salisbury's Cabinet had approved the Admiralty's plan to maintain at least one of its gunboats at each of the treaty ports on the river, both as a deterrent to potential troublemakers and as a means of quelling any unrest and disorderliness that might break out if the Boxers' influence began to prevail in any of these cities. Although a few of the gunboats had been withdrawn from some of the more exposed spots on the river by the end of July, a small Cabinet committee of three (Goschen, Hamilton and Lansdowne) had used the prime minister's absence to order a British occupation of Shanghai on 15 August. This decision soon backfired since France, Germany and Japan all began expressing an interest in the future of the city and the region as well. Far from consolidating Britain's position on the Yangtse, therefore, the occupation looked likely to undermine it. As a result, worried by the intensity and querulousness of the French, while at the same time wishing to contain the spread of Russian influence in the northern regions of the country, Britain reached an agreement with Germany on 16 October 1900 which gave effect to the principle of free trade and what would later be graphically described as the 'Open Door.'[17] Although neither government wished to see China plunged into chaos by the collapse of the state, the two powers could hardly be said to have been successful in swaying the other allies to moderate the terms of the final protocol on 7 September 1901, or to reduce the price which the imperial government was forced to pay for its complicity in the

15. Morse, *International Relations, III*, pp. 193-210; Selby, *Paper Dragon*, pp. 178-83.

16. Chester C. Tan, *The Boxer Catastrophe* (New York, 1967); Morse, *International Relations, III*, pp. 211-88; Selby, *Paper Dragon*, pp. 182-91.

17. Young, *British Policy*, pp. 160-213.

Boxer rebellion. China's humiliation was complete or so it seemed at the time.[18]

It was in this mood of unusual frailty that Britain approached its naval dilemma in the Far East. Ever since 1898 the Russians had substantially increased their naval strength in this region surpassing that of the Royal Navy as they did so. If one added the smaller French naval contingent to that of its Russian ally, the British position was made to look even worse. This unusual situation of being in a relative as well as a numerical inferiority to other European naval powers, at least in the Far East, was not appreciated by either the British Admiralty, or indeed by serving officers and gentlemen brought up in the era of the Raj and Pax Britannica. Informed comment in some of the London daily newspapers dwelt upon the matter and suggested that something ought to be done before long to redress the balance of advantage in Britain's favour.[19] It was partly to assuage this feeling of vulnerability, coupled to the lack of a suitable alternative power with whom it would be possible to do mutually satisfactory business, that some of the leading members of the British Cabinet turned their attention eastwards towards Japan in a bid to end the era of "splendid isolation." Apart from any other facets it might bring to bear in the Far East, the alliance would immediately ensure naval supremacy for the two powers in the region.[20]

While the British also saw the Anglo-Japanese Alliance of 30 January 1902 as a strategic expedient designed to forestall Russian aggression in Manchuria and Korea, the Chinese, whose hatred for the Japanese was well known, regarded the agreement as a deadly compact designed to exploit their country by two of the powers which had the capacity to do so. Britain, which often claimed to be China's erstwhile friend, had shown just how deep that supposed friendship went by failing to explain adequately just what this latest act of diplomacy was designed to achieve. Sadly, it would not be the last time that it demonstrated what some would say was a callous and blatant disregard for the sensitivities of the Chinese. Such was the humble role assigned to China in the early twentieth century. Its five millennia of civilisation had failed to save it from such an indignity.

While the British vainly sought peace and stability in China so that their merchants could get on with the business of making money from developing their interests in the country, the omens for such a prolonged period of calm were not good. Two years after renouncing isolationism by signing its defensive alliance with Japan, Britain found itself on the brink of yet another major conflagration in the region with the opening of the Russo-Japanese War in February 1904. Worried by the potential implications of this unwelcome event, Balfour's Cabinet had looked around for some time for a means of limiting the damage caused by being allied to a likely protagonist in a war which it had no desire to be pulled into. It was relieved to discover that the French felt the same way and that an entente between them would ensure that neither power would become an actual belligerent in the struggle over Korea.[21]

Although the British were delighted not to be involved in the war, they found themselves benefitting greatly from the Japanese victory both on land and at sea. After the almost total eclipse of the Russian fleet in the battle of Tsushima Strait on 27 May 1905, for example, it was no longer necessary for the British to maintain such a relatively large number of capital ships in Chinese waters. Apart from the persuasive argument for a redeployment of its battleship fleet in one or other of the European theatres, the dramatic improvement in Britain's strategic position in China did not lead to a marked reduction in the other classes of warship it had in the region. Part of the reason for this reluctance to disengage its naval force from eastern waters can be found in H.M.G.'s continued support for its businessmen who were engaged in the profitable enterprise of opening up China to British goods and services.[22] It displayed (one might accuse it of openly

18. Morse, *International Relations, III*, pp. 330-59; "Late Ch'ing foreign relations, 1866-1905" by Immanuel C. Y. Hsu in John K. Fairbanks & Kwang-ching Liu (eds.), *The Cambridge History of China* vol. *11* (Cambridge, 1980), pp. 70-141.

19. Arthur J. Marder, *The Anatomy of British Sea Power* (New York, 1976), pp. 427-9.

20. Young, *British Policy*, pp. 295-318; C. J. Lowe, *The Reluctant Imperialists*, vol. I. (London, 1967), pp. 225-251; Ian Nish, *The Anglo-Japanese Alliance* (London, 1966), pp. 174-228.

21. C. J. Lowe & M. L. Dockrill, *The Mirage of Power, vol. I* (London, 1972), pp. 1-11. Even so, neither country was prepared to sign an entente without trying to gain the best bargain it could. P. J. V. Rolo shows in his book *Entente Cordiale* (London, 1969), pp. 149-270, that the desire for territorial compensation was a more persuasive factor in arranging the entente than the fear of entanglement in a Far Eastern war.

22. Admiral Jacky Fisher's programme to rationalise the Royal Navy, which he began devising and implementing after becoming first sea lord in October 1904, had fairly immediate effects in the Far

flaunting) its commitment on this score by retaining a fleet of gunboats and other warships in Chinese waters to protect this trade from the attentions of pirates and others who might have otherwise been tempted to interfere with it. In this way the commercial exploitation (H.M.G. was wont to describe it as 'development') of China was greatly enhanced. Consequently, the metaphorical expression of an 'open door' policy was not merely an example of political rhetoric dreamt up by a Tory government and abandoned by its Liberal successor. On the contrary, Asquith's government remained every bit as concerned to keep that particular door ajar, or to push it open further, as Salisbury's Cabinet had been in 1900.

Whatever the situation was elsewhere in East Asia, the wearisome fact remained that Anglo-Chinese relations were hardly likely to reach a truly satisfactory state while the xenophobic empress dowager remained the dominant figure in framing imperial policy in Peking. Her death at the age of 73 on 15 November 1908, however, following the fatal collapse on the previous day of the 37 year old Emperor Kuang-hsu, appeared to offer the British the most enticing prospect yet of forming a better, more constructive and less enigmatic relationship with the Manchu court than had been the case in the past.[23]

In reality the baleful influence which the empress dowager had exerted upon the throne in her lifetime, especially in its idiosyncratic behaviour towards foreign powers, was not substantially eroded by her demise. Therefore, while Britain may well have wished for commercial purposes, if for no other higher motive, to have posed as China's friend, the hollowness of the claim was evident to the authorities in Peking. As a result, it would be fair to say that a basic level of distrust remained to bedevil their relationship in the few years left to the Ch'ing dynasty. Nonetheless, this official reserve did not amount to much in practice for the Chinese authorities were no longer in a position to dictate terms to any of the great powers, least of all to Great Britain, a country which had shown in the past that it possessed the industrial and military muscle to impose its will upon the Manchu court when and if called upon to do so.

By the time of the Chinese revolution in 1911, British investments in China ranged from railways and mining concessions to textiles, poultry and tobacco. Financial credit was provided by the Hong Kong and Shanghai Banking Corporation and many firms in Shanghai and Tientsin availed themselves of these benefits. In addition to the import/export trade, a large number of firms were involved in a wide variety of other commercial tasks in the treaty ports. Ownership of both large tracts of land and buildings was also a source of considerable wealth for the British in China at this time.[24]

While these investors quite naturally desired more than just a token element of political stability, the Chinese revolution ensured that they were denied even this in the course of the next two years. In the ensuing turmoil brought on by the eclipse of the Ch'ing dynasty and the birth of the republic, Britain had little option but to keep its ships in place and trust its faith in their deterrent value. On the whole, this policy worked as the various belligerents chose not to widen the scope of the conflict by attacking or even meddling with the economic interests of the great powers.

Relieved that it had emerged relatively unscathed from the tumultuous events that had taken place in China, H.M.G. was beginning to come to terms with Yuan Shih-k'ai's presidency when the European situation deteriorated to the point of war in August 1914.

East. Shortly after the destruction of the Russian fleet at Tsushima in May 1905, Fisher felt confident enough about the naval situation in the Far East for him to withdraw all five of the British battleships from Chinese waters and redeploy them elsewhere in European waters. Paul Kennedy, *The Rise and Fall of British Naval Mastery* (Atlantic Highlands, N.J., 1988), p. 217.

23. At the time it was rumored that there was evidence of the empress dowager's handiwork in Kuang-hsü's rapid demise. While conclusive proof of this fact has never been established, the temptation to regard his death as murder is overwhelming. Apart from the fact that her hatred for the emperor was well known, the prospect of such an individual exercising full powers after her own death is thought by most scholars to have been a sufficient inducement for Tz'u-hsi to have conspired with Yuan Shih-k'ai to poison the emperor and prevent him from gaining his rightful inheritance. Immanual C. Y. Hsu, *The Rise of Modern China* (London, 1975), p. 510. A quite different version of the background to this event is supplied by J. O. P. Bland & E. Backhouse in their hagiographical account of Tz'u-hsi's life and times, *China Under the Empress Dowager* (London, 1910), pp. 443-67. They contend that the emperor had been seriously ill for at least a year before he died. This is confirmed to some extent by Jerome Ch'en in his book *Yuan Shih-K'ai 1859-1916* (Stanford, 1961), p. 98.

24. According to the Far Eastern Survey, vol. 6, no. 13 (13 June 1937), quoted by S. L. Endicott in his book *Diplomacy and Enterprise* (Vancouver, B.C., 1975), Table 1, p. 186, 590 British firms were engaged in trading enterprises in China in 1913, a figure amounting to 15% of the total of all foreign concerns in the country. It also revealed that 8,966 British citizens lived in China at this time. For an estimate of the value of this business, see the Board of Trade file on British investments in China and especially a minute by P. M. Wack on 1 April 1947 in BT 11/3390.

Once the Japanese had entered the fray on 23 August, the threat posed by the German squadron based hitherto at Tsingtao was swiftly removed by Vice-Admiral Graf von Spee's decision to leave Chinese waters in search of a safer harbour and richer pickings along the South American coast.[25]

Von Spee's decision to withdraw from China, welcome though it undoubtedly was to the Admiralty in London, did not result in the British removing all their warships from the region even if it led ultimately to a reduction in the number of vessels on Far Eastern duties. A number, admittedly a fluctuating one, were still deemed necessary to continue policing the vast area, in excess of 16 million square miles, covered by the China Station. Apart from recommissioning the 12,175 ton battleship HMS *Triumph*, which had been in reserve at Hong Kong at the outset of the campaign, Britain had a variety of warships on hand to patrol Chinese waters, show the flag and assist in trade protection. While there was a good deal of coming and going on the China Station throughout the war, the Admiralty was insistent upon retaining a naval presence in the region and of not relying entirely upon expressions of good faith from their eastern ally, the Japanese, who professed a willingness to look after British interests for them.[26]

While alarm about the unscrupulousness of the Japanese grew in British circles after the presentation of the infamous Twenty One Demands in January 1915, Asquith's government was left hoping that it could avoid being dragged into the controversy or become identified too closely with their ally's imperialistic ambitions in China. In British eyes the Japanese action was reprehensible not least because it was likely to alienate the Chinese and make them more inclined to lapse into another bout of destructive anti-foreignism. Although President Yuan Shih-k'ai's acceptance of the Japanese ultimatum in May 1915 resolved the matter temporarily, it left the British apprehensive about the future.

When China finally entered the war on the side of the British and Japanese on 14 August 1917, it did so out of a conscious fear of the future. On the face of it the decision to ally with two of the nations which had done most in both the distant and recent past to embarrass and molest it appears curiously perverse. Yet far from being foolish and illogical, China's late entry into the war achieved one of its government's primary objectives, namely, securing a berth for itself at a future international peace conference. Unfortunately, the presence of China's delegates at the Versailles Conference from January 1919 onwards did little to safeguard Chinese interests and they withdrew in disgust four months later over the awarding to the Japanese of former German rights and concessions in Shantung and Manchuria. This contentious decision by the allies, giving formal approval to what had been the basis of Japan's earlier notorious ultimatum to Yuan's government in January 1915, took the Chinese government by surprise, convincing many in Peking and far more in the provinces beyond that the European nations could not be trusted. This award did considerable damage to the European cause by doing much to stimulate Chinese nationalism, in particular the May Fourth Movement, while strengthening the already widespread belief that ultimately on issues concerning China, its people could only rely upon themselves. Xenophobia, which was never far from the surface in the world's most populous country, began thereafter to reassert itself with a vengeance.[27]

At the same time that anti-foreignism was gaining ground in the coastal cities and treaty ports, the entire country began to be wracked by rebellion and the breakdown of law and order. In the absence of an imperial authority, China rapidly disintegrated into provincial particularism and warlordism. In this atmosphere of almost perpetual crisis, warships of the European powers and those of the United States returned in greater numbers to the rivers and ports of China determined to uphold the national interests of the gov-

25. Arthur J. Marder, *From the Dreadnought to Scapa Flow, vol. II* (London, 1965), p. 104.

26. Marder suggests that at least for the first few months of the war the British had nineteen warships in Chinese waters. Some of these were withdrawn subsequently. HMS *Triumph*, for example, was transferred to the Dardanelles in the early months of 1915. Allen, et al., described the British naval contingent in Chinese waters in 1914 as comprising one battleship (*Triumph*), two armoured cruisers, two light cruisers, eight destroyers, four torpedo boats, three submarines and a number of small mainly river vessels. Marder, *From the Dreadnought . . II*, p. 103; G. H. Allen, H. C. Whitehead & F. E. Chadwick, *The Great War, vol. III* (Philadelphia, 1916), p. 412; Anthony Preston, *Battleships of World War I* (New York, 1972), p. 92, 108.

27. Chow Tse-tsung, *The May Fourth Movement* (Cambridge, Mass., 1967), pp. 84-94; Y. C. Wang, *Chinese Intellectuals and the West 1872-1949* (Chapel Hill, N.C., 1966), pp. 307-61; "Themes in intellectual history: May Fourth and after" by Benjamin I. Schwartz in J. K. Fairbank (ed.), *The Cambridge History of China* vol. *12* (Cambridge, 1983), pp. 406-50.

ernments that had sent them out east. As the north-south divide grew ever deeper, with the Yangtse forming a natural barrier between the two geographical halves of the country, the naval forces at the disposal of the foreign powers in China assumed an increasing responsibility for policing the areas in which they were situated. Unwilling to surrender their economic interests to the safekeeping of others in what was rapidly becoming a near-anarchic state, Britain had four warships, including the 10,000 ton cruiser HMS *Hawkins* and fifteen modern gunboats on the Yangtse alone by the summer of 1920.[28]

If not at first it soon became obvious to the powers concerned that a China engulfed by civil war and teetering on the verge of collapse benefitted no state other than Japan. Being unsympathetic to the latter's cause, the Americans used the China card deliberately in support of their bid to see the Anglo-Japanese Alliance wound up and a new deal struck over the future of the Far East. Britain responded sluggishly to these American overtures, realising that it had gained substantial strategic benefits from the existence of the alliance during the First World War. In the end, of course, its fragile, war-torn economy and the nature of its financial indebtedness to the United States proved to be the two most decisive factors in forcing the coalition government of David Lloyd George to the conference table at Washington from November 1921 to February 1922. Once there, however, its representatives played a constructive role in the eventual settlement. On paper at least, the results of the conference looked to be favourable to the Chinese, containing as they did a basic recognition by the signatory powers that if they continued to deny China its sovereign rights, by insisting upon the retention of their own extraterritorial rights and tariff privileges, they could arouse the Chinese masses against them, thereby putting at risk the very investments they wished to preserve.[29]

As so often happened in the past, the foreign powers said one thing and then did another. Several years elapsed before the Nine Power Treaty was actually ratified and its clauses implemented. In the meantime the chronic political instability in China worsened with the resumption of the civil war in November 1922 and became such that the foreign warships stationed in the country were sometimes drawn into the fray. British warships, by virtue of their numbers and the scale of the investments which they were assigned to protect, were often to the fore in these incidents. Many of their activities from Canton northwards along the coast and up into the interior of China in the post-1922 period can be classified as relatively modern examples of gunboat diplomacy.[30] Whether force was actually meted out to gain specific objectives or not, the fact remained that the vessels involved in these incidents were prepared to use their weapons if necessary. Moreover, the acts themselves constituted an interference in Chinese affairs which was contrary to the spirit and letter of the Nine Power Treaty.

By the end of 1924 many Chinese people, not just the radicals and militants, were disposed to agree with Dr. Sun Yat-sen that extraterritoriality and the whole apparatus of the unequal treaties were an unjustifiable anachronism and ought to be abolished. A series of unfortunate and tragic mistakes made by the British in the spring and early summer of the following year, culminating in the May 30th incident at Shanghai and the 'Shameen massacre' of 23 June 1925, greatly increased this awareness and led to the imposition of a general strike in Hong Kong and boycotts against British and Japanese goods in Canton and throughout the province of Kwangtung.[31]

If the British felt that 1925 was a bad enough year for them in China, 1926 began even worse and remained ghastly for much of the next twelve months. One controversial incident stalked the other as the British found themselves the chief target of the Nationalists' leaders rhetoric and the enduring symbol of foreign repression. General Chiang Kai-shek's announcement in July 1926 of the opening of his Northern Expedition to reunify the republic under a Nationalistic government did much to touch off this new wave of xenophobia which swept along the Yangtse valley. Whenever it became threatening, British naval vessels were called

28. Kemp Tolley, *Yangtze Patrol* (Annapolis, Md., 1971), p. 90.

29. Robert T. Pollard, *China's Foreign Relations 1917-1931* (New York, 1933), pp. 205-47.

30. Sir James Cable in his standard work on the subject entitled *Gunboat Diplomacy 1919-1979* (London, 1981) classifies four different types of force which has been used by governments in this period to support their diplomatic endeavors. Cable asserts that the British government resorted to the use of 'definitive,' 'purposeful' and 'catalytic' force in its dealings with the Chinese during the 1920s and 30s, see pp. 57-81, 198-209.

31. Akira Iriye, *After Imperialism* (Cambridge, Mass., 1965), pp. 60-1; H. G. W. Woodhead, (ed.) *The China Year Book 1926-7* (Tientsin, 1926), pp. 895-1016.

into action to try and curb the excesses of the Kuomintang's more volatile supporters. Anyone with a sense of history witnessing the unrestrained naval bombardment of Wanhsien on 5 September 1926, for example, would have had little trouble in recognising a Palmerstonian dimension to the shelling of the old city by HMS *Widgeon* and HMS *Cockchafer*.[32]

Fortunately sanity soon prevailed; the British government coming to the rather belated conclusion that incidents like that at Wanhsien were harmful and that an accommodation would have to be made with the most vibrant force in Chinese politics at this time, namely, the Nationalist government installed in the south of the country. Once this realisation dawned, Stanley Baldwin's Conservative government in London began to adopt a two-track policy as far as China was concerned. While its embassy personnel were encouraged to retain their diplomatic links with the authorities in Peking, its representatives in the south of the country were being urged to open negotiations with the KMT administration at Canton in the hope that in return for British support for the systematic implementation of the Nine Power Treaty, the Nationalists would use their influence among the people of Hong Kong and Kwangtung province to call off the anti-British strikes and boycott. As an act of apparent good faith, the British government drew up the December Memorandum which it circulated to the other signatory members of the Nine Power Treaty. This document, despite its diplomatic hyperbole, seemed nonetheless to be a commitment on behalf of H.M.G. towards satisfying, as far as possible, the legitimate aspirations of the Chinese people, especially in regard to tariff autonomy and a revision of the international treaties forced upon the imperial court and the republican governments that had succeeded it.[33]

Far from leading to a rapid improvement of the British position in China, the December Memorandum failed to receive the blessing of either of the two main factions in the Nationalistic leadership. Both the leftists, who had established a provisional government with Russian backing at Hankow in January 1927 and those of a more moderate political persuasion who sympathised with the aims of the Northern Expedition, had used anti-foreignism as a popular rallying cry to gain support from the people in the past and neither group was disposed to lay this attitude aside for the time being. Within the first fortnight of the new year this wave of xenophobia had swept away the British concessions at Hankow and Kiukiang and made life virtually untenable for foreign businessmen at Changsha. British warships were used to pick up the evacuees on each occasion. Encouraged by the scale of their success, the Nationalists began to make threatening noises about the future existence of the International Settlement at Shanghai. Rumours of this sort led to a massed naval demonstration off the port by thirty warships drawn from eight nations with interests in China. By the end of the month some forty thousand foreign troops were assembled and ready for combat should the KMT or its supporters attempt to overrun the Settlement. This firm response on behalf of the international powers ensured that any plan of action against Shanghai that had been considered by the KMT was now suspended indefinitely.[34]

Far from bringing the crisis in China to an end, the assertive role played by the foreign powers over Shanghai alienated the two wings of the Nationalists still further. In Nanking matters came to a head in March 1927 when serious looting and mob action became once again the order of the day. Aggravated by what was happening in the city and anxious lest the situation deteriorate even more, the British and Americans retaliated by instructing their warships to bombard Nanking until order was restored.[35] After shelling the city without restraint, the British cruiser HMS *Emerald*, together with the two American destroyers USS *Noa* and USS *Preston*, anchored, put men ashore and began evacuating their nationals from the city. Other ships were performing similar tasks elsewhere on the Yangtse. By the end of the month forty seven warships were concentrated at Shanghai; Britain supplying an aircraft carrier, five cruisers, a destroyer and two gunboats to the collective effort.[36]

From being at such a low ebb, Anglo-Chinese relations began to make a dramatic recovery in the coming

32. H. G. W. Woodhead, *The China Year Book 1928* (Tientsin, 1928), pp. 666-672; Tolley, *Yangtze Patrol*, pp. 139-43.

33. Pollard, *China's Foreign Relations*, pp. 296-98; Iriye, *After Imperialism*, pp. 99-101.

34. Woodhead, *China Year Book 1928*, pp. 737-55; Cable, *Gunboat Diplomacy*, p. 203; Tolley, *Yangtze Patrol*, pp. 135-37.

35. Woodhead, *China Year Book, 1928*, pp. 723-36; Cable, *Gunboat Diplomacy*, p. 204. According to Tolley's account of the action in *Yangtze Patrol*, pp. 152-64, *Noa* fired nineteen flat-nosed, high explosive shells from her 4-inch guns. *Preston* fired fifteen more similar shells and HMS *Emerald* seventy six rounds from her 6-inch 100-pounders.

36. Tolley, *Yangtze Patrol*, p. 165.

months, mainly as a result of Chiang Kai-shek's decisive action in April 1927 against the leftists in the KMT who had congregated at Wuhan. Thereafter, as the moderate faction began to establish its ascendancy within the party by purging the Communists and their sympathisers from its ranks, a more pragmatic, less confrontational, policy was adopted towards the business interests of the foreign powers in China. This more realistic attitude survived the resignation of General Chiang in August and encouraged British shipping to begin recovering some of the ground it had lost over the last three tumultuous years. As the Yangtse opened up once more to foreign commerce, British merchants and traders began returning to the ports from which many had been driven by mobs of frenzied Chinese earlier in 1927.[37]

While the political carousel continued to turn in China with the resignation of Wang Ching-wei in September and Chiang Kai-shek's return from Japan in November 1927, official British policy remained one of support for what the Nationalists were doing without identifying anyone in particular with whom they were openly consorting. They maintained this position until General Chiang and the Nationalist forces which he commanded had completed the second and final phase of the Northern Expedition in June 1928. At the same time the Royal Navy discontinued the convoy system it had operated for British shipping on the upper Yangtse since December 1927.[38] Thereafter the contentious question of treaty revision could not be long delayed since the essential requirement of the foreign powers, i.e., that there must be a unified government in China with which to discuss these issues, now appeared to be an indisputable fact.

Once full tariff autonomy had been restored to the Chinese by the agreement signed with the British on 20 December 1928, the very day that Baldwin's government in London officially recognised Chiang Kai-shek's régime as the National government of China, talks got under way on bringing an end to the whole concept of extraterritoriality. Neither Sir Austen Chamberlain, of the Baldwin government, nor his successor at the Foreign Office Arthur Henderson, were left in any doubt as to the depth of feeling on this score in China. Both were informed that if an acceptable solution to this problem could not be found by negotiation, the Nationalists would resort to a unilateral repudiation of what they described as the 'unequal treaties.' Under pressure to reach agreement with the Nationalists before 1 January 1930, Ramsay MacDonald's Labour government formally announced the return of the British Concession at Chinkiang on 15 November 1929. Shortly afterwards Henderson agreed that the deadline of 1 January would be seen as the commencement of the process of abolishing extraterritoriality. This had the effect of improving still further relations between the two governments. It did not take long to reach agreement on the abrogation of the lease at Wei-hai-wei, which came into effect on 1 October 1930, or the return to Chinese control of the British Concession at Amoy in the previous month.[39]

Just when it appeared that political stability had settled upon China, the country was plunged once more into the maelstrom of a civil war. British gunboats saw a great deal of action during this turbulent year; none more so than HMS *Teal*, HMS *Aphis* and HMS *Bee*, all of whom were caught up in the fight for control at Changsha in late July. This city, well known for the depth of its anti-foreign feeling, displayed this characteristic with some ferocity as the month drew to a close forcing the British, Americans, Italians and Japanese to intervene decisively and evacuate those foreigners who did not wish to tempt fate by staying put and risking the wrath of the mob.[40]

By November 1930 the latest bout of civil and military unrest to sweep over China had at last been brought to an end in Chiang Kai-shek's favour. If he thought that consolidating his hold on power by being appointed to the presidency of both the National government and the Executive Yuan would impress the foreign powers, however, he was to be sorely disappointed. Such had been the history of bitter feuding and factional politics since the revolution of 1911, that neither the British nor the Americans had much confidence in the hope that the restoration of peace on this occasion would presage a long, uninterrupted period of political calm in China. In this mood, the foreign powers began to drag their feet over the question of bringing an end to extraterritoriality. There had been

37. Pollard, *China's Foreign Relations*, pp. 330-38; Iriye, *After Imperialism*, pp. 133-42, 145-49.

38. H. G. W. Woodhead (ed.), *The China Year Book 1929-30* (Tientsin, 1930), pp. 775-79; Cable, *Gunboat Diplomacy*, p. 205.

39. H. G. W. Woodhead (ed.), *The China Year Book 1931* (Shanghai, 1931), pp. 481-87; Pollard, *China's Foreign Relations*, pp. 354-56; 372-87.

40. Tolley, *Yangtze Patrol*, pp. 192-94; Cable, *Gunboat Diplomacy*, p. 207.

very little progress on this front before the Nationalists at their convention in May 1931 revived the threat to abolish the 'unequal treaties' by their own action if necessary. Although a draft treaty was hurriedly cobbled together by Sir Miles Lampson and Dr. C. T. Wang, the representatives of the British and Chinese governments respectively, with notes being exchanged between them on 6 June 1931 covering the terms of their agreement, that was as far as the quest for an end to extraterritoriality went for more than a decade.[41]

Thereafter the attention of the Chinese government was diverted to more immediate problems, namely, the danger to be anticipated from Japan. In using the Mukden incident of 18 September 1931 as a pretext for its seizure of Manchuria, Japan demonstrated its conversion to military rule and to the imperial doctrine of *Nanshin-ron* or southward expansion. When Japan extended the scope of its invasion to Shanghai at the mouth of the Yangtse in January 1932, the British responded by ordering five of their 10,000 ton, 8-inch gun cruisers of the Kent Class to the port to join units of the French, Italian and U.S. navies in a successful bid to deter the two belligerents in the Sino-Japanese encounter from disrupting or endangering the continued existence of the International Settlement in the city.[42]

Japan's interest in the economic penetration of China, much stimulated by its wretched experience in the wake of the Wall Street Crash of October 1929, became more evident as the 1930s proceeded. Beginning in the north-east, Japanese merchant shipping interests sought to increase their share of China's lucrative coastal and riverine trade at Britain's expense. It failed comprehensively to do this. Whatever success it may have had in Manchuria was more than cancelled out by its dismal performance elsewhere in China. While Japanese shipping in Chinese waters went into an accelerated decline in the post-1931 period, measured by both the number of ships entering and clearing customs as well as by actual tonnage, the British share of the China trade held relatively steady and only began to fall away appreciably in the years following the beginning of the Sino-Japanese conflict in 1937. (See Table I.)

Throughout the 1930s as one crisis followed another in the Far East without diplomatic resolution, British commercial interests in China were once more found to be vulnerable to forces beyond their control. Although ultimately military conflict, whether of a civil war nature against the Communists or as a defence against invasion by the Japanese, was bound in the long term to distort the patterns of trade in China, Britain could and did still derive substantial benefits from providing a service to the community in the interim period. It was particularly anxious to protect its most important commercial assets in and along the Yangtse basin and did so by retaining a total of thirteen gunboats and one cruiser on the river. Once the undeclared Sino-Japanese War broke out after the Marco Polo Bridge incident of 7 July 1937, however, British shipping interests in China experienced a rapid fall in business and prosperity. Their commercial vessels encountered difficulties in honouring contracts since they were excluded from certain ports and rivers for indefinite periods because of the military operations being waged in the country. This acute dislocation of the British China trade had major consequences, for once this decline had set in it proved to be irreversible. In the past conventional wisdom has dictated that in this period of great instability when British and other foreign vessels were being prevented from using, say, the Yangtse, Japanese shipping interests stepped in to take up the slack. In fact there is very little hard evidence to support this view. If anything, the statistical information available points to another quite different conclusion.[43]

Although the British did not like what was happening in China, there was not much that they could do about it on their own. In the absence of any agreement on concerted action by the signatories to the Nine Power Treaty, Anthony Eden, the British foreign secretary, tried in vain during the late autumn and early winter of 1937-8 to interest the Roosevelt administration in some form of naval demonstration off the coast of China as a means of warning the Imperial Japanese forces that they should behave or face the consequences. His view that the time had come for a

41. Iriye, *After Imperialism*, pp. 285-88.

42. Cable, *Gunboat Diplomacy*, p. 209.

43. Irving S. Friedman, *British Relations with China 1931-1939* (New York, 1940), pp. 217-25. As can be seen from Table I, however, the Japanese shipping trade in China fell at an even faster rate than that of the British in the period 1936-38. In fact, it had experienced a loss in trade in terms of vessels entering and clearing Chinese customs every year from 1932 onwards. Why this should have been the case has not been adequately researched as yet. It is a field that deserves further study.

TABLE I—BRITISH AND JAPANESE SHIPS ENTERING AND CLEARING CHINESE PORTS 1900-1938

Year	*British Ships.*	*Japanese Ships.*
1900	22,618 (23,052,459 tons).	4,917 (3,871,559 tons).
1910	28,000 (34,253,439 tons).	31,197 (18,903,146 tons).
1911	28,885 (34,712,440 tons).	21,259 (19,172,727 tons).
1912	31,909 (38,106,732 tons).	20,091 (19,913,385 tons).
1913	32,186 (38,120,300 tons).	22,716 (23,422,487 tons).
1914	32,705 (38,795,409 tons).	22,143 (23,684,774 tons).
1918	31,034 (29,911,369 tons).	24,961 (25,283,373 tons).
1919	36,074 (36,284,312 tons).	27,182 (27,532,449 tons).
1920	39,543 (40,315,707 tons).	25,152 (28,191,592 tons).
1921	38,855 (42,326,445 tons).	25,385 (31,738,783 tons).
1922	40,075 (47,698,139 tons).	25,281 (32,961,333 tons).
1923	44,055 (51,965,230 tons).	25,063 (33,288,617 tons).
1924	48,886 (55,715,925 tons).	26,294 (34,759,884 tons).
1925	36,937 (42,942,484 tons).	27,261 (35,081,116 tons).
1926	36,474 (47,645,090 tons).	29,654 (38,938,844 tons).
1927	33,791 (40,258,049 tons).	27,105 (35,745,535 tons).
1928	48,523 (56,036,567 tons).	29,839 (39,065,724 tons).
1929	50,845 (57,926,507 tons).	31,705 (42,349,647 tons).
1930	49,402 (57,246,927 tons).	33,755 (45,630,705 tons).
1931	50,534 (60,560,794 tons).	31,589 (43,042,411 tons).
1932	49,517 (59,430,602 tons).	13,441 (19,775,917 tons).
1933	47,574 (58,215,213 tons).	12,863 (20,168,140 tons).
1936	48,154 (57,345,515 tons).	17,911 (24,913,576 tons).
1937	35,232 (36,105,795 tons).	10,435 (12,815,014 tons).
1938	23,398 (28,403,147 tons).	7,242 (8,743,975 tons).

n.b. What these figures do not reveal, however, is the extent to which the Japanese were employing Chinese flagged vessels in the period after the Manchurian incident of September 1931 to carry their trade for them.

Sources: H. G. W. Woodhead et al., *The China Year Book* vols. *1912-39* (London, Shanghai & Tientsin, 1912-39), which in turn used information provided on an annual basis by the Chinese Maritime Customs.

showdown with the forces of totalitarianism seemed to be borne out by a series of rash acts committed by the Japanese military against foreign shipping on the Yangtse in December 1937. For a few days at least the latest Far Eastern crisis provided Eden with his best chance yet to persuade the Americans that some form of punitive action was necessary to bring the Japanese to their senses. Whatever prospects there had been for some form of joint or parallel action with the United States Navy in eastern waters were soon disspelled, however, by astute Japanese diplomacy. Once the government in Tokyo had issued a fullsome apology and agreed to pay an indemnity for the *Panay* incident, the U.S. government decided not to pursue the matter any further. Eden's hopes of a more trenchant response were dashed and he was left reflecting on what might have been.[44]

Despite the growing difficulties which they faced by remaining behind in a country convulsed by war and subject to an irksome measure of Japanese military rule, British ships were not withdrawn from Chinese waters. They had been sent there to protect British investments in China and to encourage bilateral trade.

44. For a full account of this extraordinary period in British foreign policy see the author's *Fool-proof Relations: The Search for Anglo-American Naval Cooperation During the Chamberlain Years, 1937-1940* (Singapore, 1984), pp. 3-161. Japanese action in China is covered in H. G. W. Woodhead (ed.), *The China Year Book 1939* (Shanghai, 1939), pp. 437-43.

No government in London at any stage of the economically ruinous 1930s could afford to neglect, let alone turn its back on these sizeable assets.[45] Chamberlain's administration followed the trend set by its predecessors in this respect. When war broke out in Europe in September 1939, therefore, H.M.G. saw good reasons for retaining the services of four cruisers, four destroyers, seventeen submarines, five escort vessels and twenty gunboats in Chinese waters. Much of the time the larger vessels in the fleet were on patrol. It was their task to intercept, detain or sink any German merchant ships they found on the high seas and to investigate all reports of enemy sightings in northern waters. As the reports were rarely accurate, the warships on the China Station spent an inordinate amount of their time in chasing elusive shadows.[46]

Once the phoney war in Europe finally gave way to the real thing in the spring of 1940 and Japanese imperial ambitions began to grow in East Asia, the Admiralty wisely came to the conclusion that conditions had changed and the deployment of a large fleet in Chinese waters had become something of a redundancy. As a result, the headquarters of the China Station was transferred from Hong Kong to Singapore and the vessels assigned to it were expected to operate in Southeast Asian waters. By November 1941 as Anglo-Japanese hostility increased, British naval activity in China had virtually come to a halt; its fleet had been run down to three cruisers (*Danae, Dauntless, Durban*) and nine gunboats, the rest having either been pensioned off or withdrawn for duties elsewhere.[47]

By the time that the Japanese cast aside peace for war in December 1941, the cruisers had gone, all but three of the gunboats had been withdrawn to Hong Kong or Singapore and British investments in China, built up at great cost over at least two centuries, were summarily left to await their fate. British power had at last been turned back from China; an era of old fashioned protectionism had passed.

45. Owing to the fact that the problems of accurately gauging British investments in China have never been satisfactorily resolved, all statements as to the value of these investments should be treated with caution. Nevertheless, a consensus has emerged amongst scholars and experts which places the value of these investments in the 1930s as being in the range of two hundred million and three hundred million pounds sterling, see Endicott, *Diplomacy and Enterprise*, p. 19; Friedman, *British Relations . . .* pp. 219-20.

46. Martin H. Brice, *The Royal Navy and the Sino-Japanese Incident 1937-41* (Shepperton, 1973), pp. 135-47.

47. *Ibid.*, pp. 145-63.

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Warships of the Ancient Mediterranean

A. F. Tilley

WARSHIPS played a major part in the history of the ancient Mediterranean. One of the world's decisive battles was fought off Salamis in 480 B.C. when a Greek combined fleet led by the Athenian navy shattered the Persian king's invasion force. Had the Greeks lost, the history of Europe might have been no more than a chapter in the history of Asia.

Specialised warships, distinct from merchant ships, were the high technology of the age. Armed with rams, they fought battles of speed and manoeuvre, like the combat of fighter aircraft in the two World Wars. They were rowed by the poorer classes of society, who through this service, indispensable to the state, increased their political power in the teeth of opposition from a land-based aristocracy of cavalry and heavy infantrymen. The need for oarsmen brought democracy.

In this article it will be argued that the nature of ancient warships has been completely misunderstood in modern times and that the misunderstanding arose from mistranslation of the names given to types of warship: a whole library of books and learned articles by scholars of astonishing erudition has been based on what could unkindly be called a schoolboy howler.

Outline

The types of warship discussed in this article had names which incorporated a number. The English words "bireme," "trireme" and "quadrireme" imply the numbers two, three and four, as do the Greek and Latin words from which the English is derived. In our era, it has always been assumed that the numbers referred to *half* the number of oarsmen in each cross-section of that particular type of ship: a bireme has been thought of as having had four oarsmen in cross-section, a trireme six, and so on. The nub of this article is that the number in the name originally referred to the whole number of oarsmen in a cross-section, and in particular that the original triremes had three, not six, oarsmen in each cross-section. This amounts to a radical revision of ideas on ancient warships, in contrast with the numerous, often acrimonious disputes as to exactly how the supposed six oarsmen were arranged in the cross-section of a trireme.

Nomenclature

According to seamanship manuals and to the *Oxford English Dictionary*, a boat with a single line of oarsmen, such as the eight-oared boats which compete in the Olympic games, is "single-banked." Double-banked boats are those with two lines of oarsmen. On each rowing bench, one rows to port and the other to starboard. That nomenclature will be used in this article.

Most writers on the subject of ancient ships call a double-banked boat "single banked," e.g. Tarn (1905, 145) and Anderson (1962, 13) and this is allowed as a secondary usage in Webster's dictionary. Similar confusion surrounds the word "room," introduced into the English language from Scandinavia to describe a single unit in an oared craft. In his book *The Ship*, Landström (1961, 64) rightly explained that in Scandinavia ". . . the size of a ship was measured by the number of *rooms* as they called them . . . Each of these *rooms* on a fighting ship meant a pair of oars, and for each pair of oars there was a thwart." In *Greek Oared Ships*, Professor Morrison (1968, 339) described a trireme as ". . . a ship in which there were three oarsmen to each unitary division or 'room,' called in Latin 'interscalmium' . . . ." These words accord with the idea put forward in this article: on the other hand the diagrams in the book make it clear that *six* men in each room was what the author had in mind.

Linguistic confusion has, I believe, been one of the factors keeping the trireme problem so long unsolved. In this article, the number of banks, and the number of oarsmen in a room, refer to the complete cross-section of the ship.

Iconography

As well as disagreement over nomenclature, there is disagreement as to the accuracy with which ancient artists depicted ships. Many writers have suggested that when it came to nautical subjects, the iconography is not to be relied upon. For example, Basch (1976, 231) wrote "Most of the galleys painted on Attic black-figured vases of the sixth century are but copies made from a few originals and certainly not the product of direct observation of the real thing."

Later, in translating and endorsing a passage by the 19th-century writer Jal, Basch (1985, 413) emphasized with italics an even greater reluctance to accept iconographic evidence as it is: "In the case of every ship representation, whether painted or carved, irrespective of whatever period it may be referred to . . . *error is always to be presumed unless the contrary is proved.*"

Later still, there is the view "Whereas geometric art abounds in iconographic conventions, especially in matters of perspective, ever since the seventh century Greek art required, especially in the case of ships, an almost photographic realism" (Basch, 1988, 177). However, even "almost photographic realism" may be less straight forward than one would hope. As Basch (1976, 232) has it: "One cannot treat the ship in vase A522 as a photograph *even if* in this particular instance one accepts, with the two authors, that the vase is an accurate witness to reality," which implies that a photograph and an accurate witness to reality ought to receive some unspecified difference in treatment.

If assessing the accuracy of ancient representations is to be considered an essential part of the study of ancient ships, then the latter will always be excluded from the realm of science. The assessments are inevitably subjective. It could be true that some ancient artist or author had never seen a ship and was quite ignorant of maritime affairs, but who can possibly tell? Understandably, those representations which accord with the theory being advanced are commended for their accuracy, and vice versa. That is why one writer on ancient ships has so rarely convinced another.

In this article it is intended to try an entirely different approach. It is suggested only that the theory put forward is in accordance with all the evidence: a comparison of theory with evidence can be objective. By contrast, assessment of evidence is like special pleading in politics or at law; or like literary criticism, in which the only important truths are the opinions of pundits.

The method I intend (to compare theory with evidence without any attempt to assess the accuracy of the latter) has one important limitation: it will leave the question of whether the theory is true or false to the judgment of the reader. Those inclined to the view ". . . error is always to be presumed unless the contrary is proved" (Basch 1985, 413) will be fairly sure that a theory which accords with unproven evidence is false. Others will think that a theory which agrees with the evidence is more likely to be true than one that clashes with it, even though the accuracy of the evidence remains unproven.

The Siren Vase

Consider the Siren Vase (Fig. 1) made in Athens about 480 B.C. but now in the British Museum. Four port-side oarsmen can be seen, each pulling an oar. Few people would doubt that the artist had in mind four starboard-side oarsmen, hidden by the men we can see. But there are six oars (not counting the steering oars) where you would expect to see only four. An extra oar appears to go under the arms of the aftermost oarsmen, the one who is looking over his shoulder. It runs across his midriff, presumably into the hands of a man we cannot see. The next man is not encumbered by an extra oar. The next again, the man whose head obscures his captain's knee, is like the first oarsman we considered—he is pulling one oar and there is another which he is not using himself, but which seems to run across his chest. The last oarsman, the bow oar, is not associated with any oar apart from his own, but there is an extra, empty oarport, well placed for the sort of extra oar associated with two of his shipmates.

If Basch is right (as I think he is) about "almost photographic accuracy" there should be an answer other than artistic error or whimsy. The answer is that the boat is triple banked, as shown in Figure 2. The empty oarport allows the foremost centre-line oarsman to row on either side. There is no difficulty in rowing triple-banked, Siren Vase fashion. I tried it in a naval cutter, originally double-banked but modified by cutting extra oarports (more precisely "rowlocks") to allow a third line of oarsmen between the other two, as shown in Figure 3.

The idea that the Siren Vase shows a vessel with three oarsmen on each bench has not, to my knowledge been criticised in print since it was first published

Fig. 1. The Siren Vase c. 480 B.C. Photograph reproduced by courtesy of the British Museum.

in 1970. The experiment met with approval in a book on experimental archaeology (Coles, 1973, 103-106), but it has always been ignored in discussions on ancient ships. It was necessary to convince a good many naval people of all ranks in order to obtain, modify and crew the cutter in which the experiment was carried out. No one doubted the idea, once he had seen a photograph of the Siren Vase and compared it with the view from above, "decoding" the broadside view of the ship (Fig. 2). At first, Professor Morrison thought the suggestion was interesting, original and quite likely to be right, but he has since changed his views about it. Professor Casson kindly allows me to quote him: "Your solution is the only one offered so far that makes sense of the features shown on the Siren Vase and is at the same time demonstrably workable."

Apart from the arrangement of oars, almost every detail of the Siren Vase ship has been accepted as accurate and informative. In *The Athenian Trireme* (Morrison and Coates, 1986, 174) the oars themselves are regarded as exceptionally carefully drawn. The report of the 1987 *Olympias* sea trials (Morrison and Coates (Ed), 1989, 15) cites the Siren Vase ship for its metal-sheathed ram, for the fitting at the mast-head, which appears to have been drawn by an artist who understood nautical technicalities, and for oars not carved from a single piece of timber, but with fitted blades. Thus it is difficult (though no doubt not impossible) to assess the Siren Vase painter's arrangement of oars as mere whimsy, or to regard its resemblance to a triple-banked boat as mere chance. The modern drawing on the dust cover of *Greek Oared Ships* (Morrison and Williams, 1968) is shown here as Fig. 4. The ship is clearly inspired by the Siren Vase, with the same six oars, four oarsmen and one empty oarport, but it was drawn with no knowledge of triple-banked rowing. It can be seen that every discrepancy between the modern drawing and the original Siren Vase brings

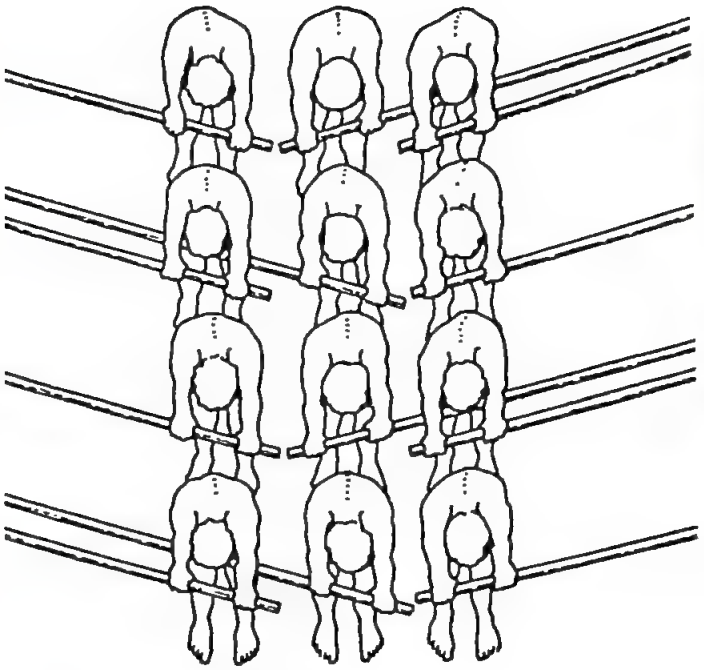

Fig. 2. The Siren Vase "decoded."

the modern drawing further from the arrangement of oars and oarsmen in an actual triple-banked boat. This militates against the idea that the Siren Vase arrangement was painted at random.

The Siren Vase system of triple-banked rowing is, I suggest, that used by the first Athenian triremes.

No one supposes that triremes were only four benches long. I believe they were generally 30 benches long. This is so close to the general view, that it is not necessary to discuss the question in this article.

Fig. 3. Triple-Banked Cutter.

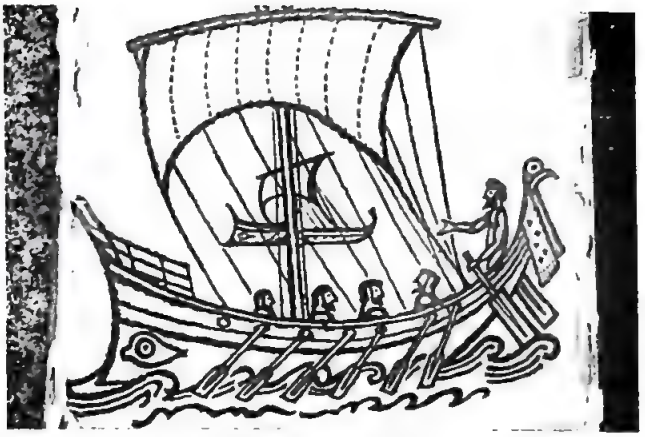

Fig. 4. Modern drawing based on the Siren Vase. Reproduced by courtesy of the Cambridge University Press.

The Victory of Samothrace

The method of rowing shown on the Siren Vase fits perfectly the ship on which the famous Victory of Samothrace (now in the Louvre in Paris) stands. On either side the ship has a pair of oarports close together, the after one a little higher than the other (Fig. 5). The width between the oarports is 2.4 m. These arrangements and dimentions are exactly suited to three men abreast, each with his own oar, as on the Siren Vase. The Samothrace ship has always been considered life-sized, or nearly so, and it has been a puzzle that the width is too little for the four men abreast suggested by the four oarports: the Siren Vase similarly gives four oarports for the three foremost oarsmen, the man in the middle having the choice of rowing either side, like the bowman in a Cornish gig.

Fig. 5. Oarports of the Victory of Samothrace.

Other Ways of Rowing Triple Banked

The method shown on the Siren Vase and the Samothrace sculpture is not, of course, the only way of rowing triple banked. A 19th century Japanese print shows whaling boats with three rows of oarsmen who stand and push, one-man and two-man oars alternating. Another triple-banked system was published by Basch (1975, Fig. 16). A man amidships adds his efforts to the oars of the rowers on either side of him, one hand on each oar. The method originally used in triremes was, I believe, rather like that.

Two-Level Ships

One of the great difficulties with the three-level trireme theory is that during the era in which the ancient historians tell us that the trireme was being introduced, the ancient artists depicted two-level ships (and, of course, one-level ships) but not three-level ships. As Davidson (1947, 23) put it: "There are no signs of anything which anyone has tried to identify as a trireme on any vase, plaque or relief of the sixth century or earlier . . .". If one compares iconography with written history, without the preconceived idea that triremes had oars at three levels, one is led to the conclusion that triremes had oars at two levels.

Figure 6 shows a Phoenician vessel of about 700 B.C., which is some years after Thucydides (I 13-14) tells us that triremes were in service. Lethbridge (1952, 114) called it "a great war canoe" and considered that it was propelled by two single lines of men, one above the other, each man using an oar in either hand (Fig. 7). Most other writers have envisaged four men in cross-section, each using a single oar (Fig. 8). I suggest an arrangement somewhere between the two (Fig. 9). On the lower level a single line of men with an oar in either hand, and on the upper level two lines of men with an oar each. Instead of sitting and pulling, the men on the lower level may well have stood and pushed—a method much used in the Mediterranean.

This three-man cross-section (Fig. 9) fits the shape of the hull better than cross-sections with the same number of men at each level, because (it is generally agreed) the hull widens out above the incised line that the artist has drawn just below the oars. As Basch has written (1969, 149): "Such a widening would have been intended to let two rowers occupy about the same space as one without increasing the beam at the water-line."

This arrangement (Fig. 9) would have had advantages for a warship that needed to manoeuvre violently in battles in which the ram was a major weapon. When an oared craft moving ahead at speed has to make the sharpest possible turn, the rudder or steering oars play little part. The propulsive oars on the inside of the turn are held in the water to act as brakes. It is no easy matter. Inexperienced oarsmen ordered to "hold water" (as the use of oars as brakes is called) may be swept off their benches, unable to hold on against the adverse leverage. With strong, determined but in-

Fig. 6. Phoenician war vessel of c. 700 B.C. Photograph reproduced by courtesy of the British Museum.

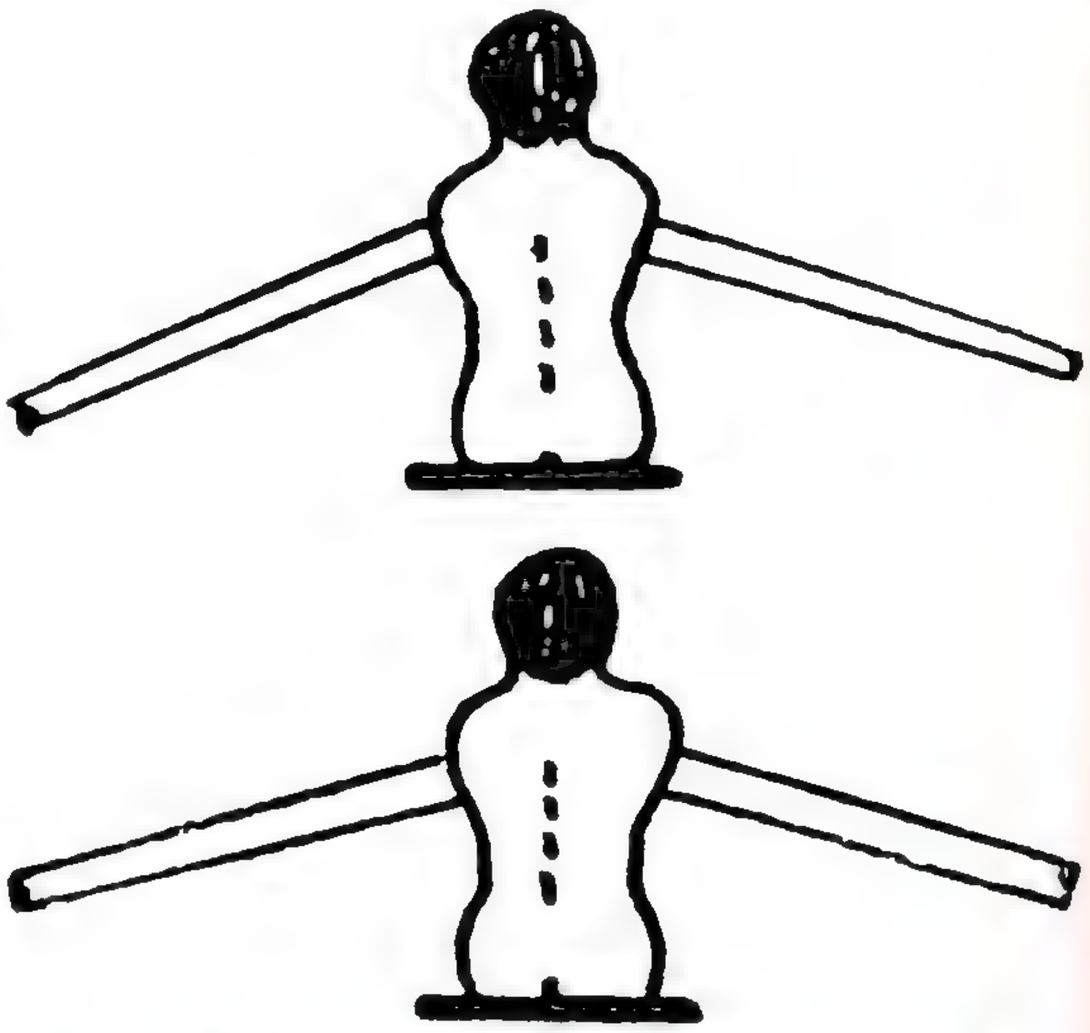

Fig. 7. Rowing arrangements for the vessel in Fig. 6 according to Lethbridge.

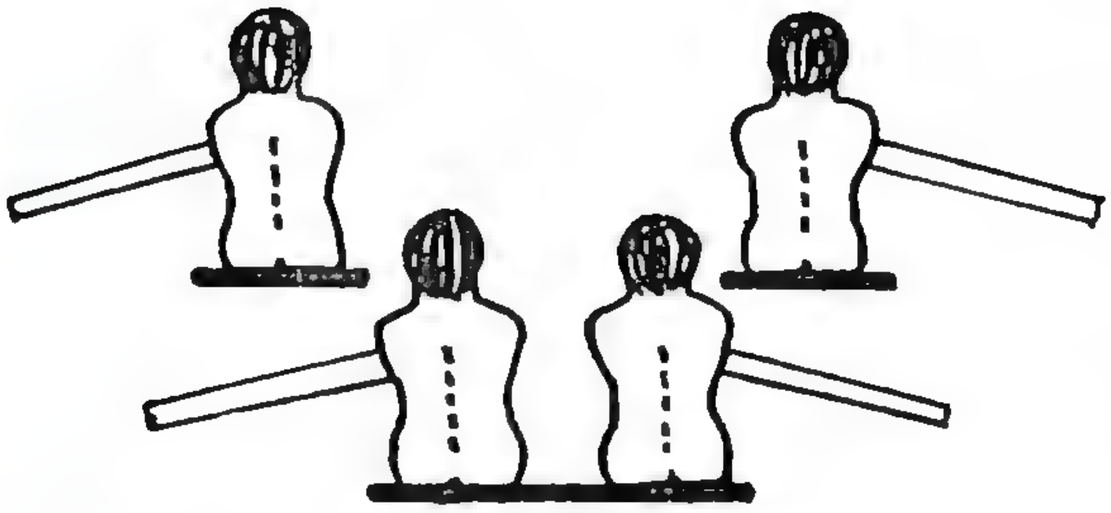

Fig. 8. Rowing arrangements for the vessel in Fig. 6 as generally assumed.

Fig. 10. Corinthian war vessel of c. 575 B.C. Photograph reproduced by courtesy of the Louvre Museum.

experienced oarsmen, oars are often broken. In craft with oars arranged as I suggest (Fig. 9) the men with two oars could have let go of one in order to use both hands and their full strength on the other. With two-thirds of her oarsmen holding water on the inside of a turn, a ship like this would have turned more sharply than a comparable ship having only one oar for each man.

A Corinthian ship of the 6th century B.C. is shown in Fig. 10. The oars appear to be out of time with each other. I suggest that the ship's oars were arranged as in Fig. 9. What is this ship's crew trying to do? I have never read a rational explanation.

The *keleustes* (the man standing up) is making a different gesture with each arm. He is the man in charge of the oarsmen, and would not, while on duty, wave his arms about at random. He is signalling orders to the crew, the two dissimilar gestures implying two different orders. He would not want the upper level to row forwards and the lower level backwards, as that would make no sense. The need for two different orders arises when the oarsmen on one side are to do something different from the oarsmen on the other side. Though he is not the helmsman, the gestures of this *keleustes* are those of a helmsman in a ship with two steering oars when he wants to turn to port (to the left). His right arm pushes the starboard tiller forward, while his left arm pulls the port tiller back. Used by the *keleustes*, these gestures order the starboard oarsmen to row on ahead, and order the port oarsmen to hold water. We can see that the upper starboard-side oarsmen row strongly ahead. Unseen on the other side of the ship, the upper port-side oarsmen are, I suggest, holding water. The unseen lower oarsmen (a single line) are also holding water to port, using both hands and all their strength on their port oars. Their starboard oars can be seen trailing in the water. The ship is carrying out an emergency turn to port, either to ram or to avoid a ram. The assumption that this ship is triple banked provides, I believe, the only rational explanation of the picture. It also provides the explanation for the many two-level ships and the absence of three-level ships in the iconography of the trireme era: the two-level ships are triremes.

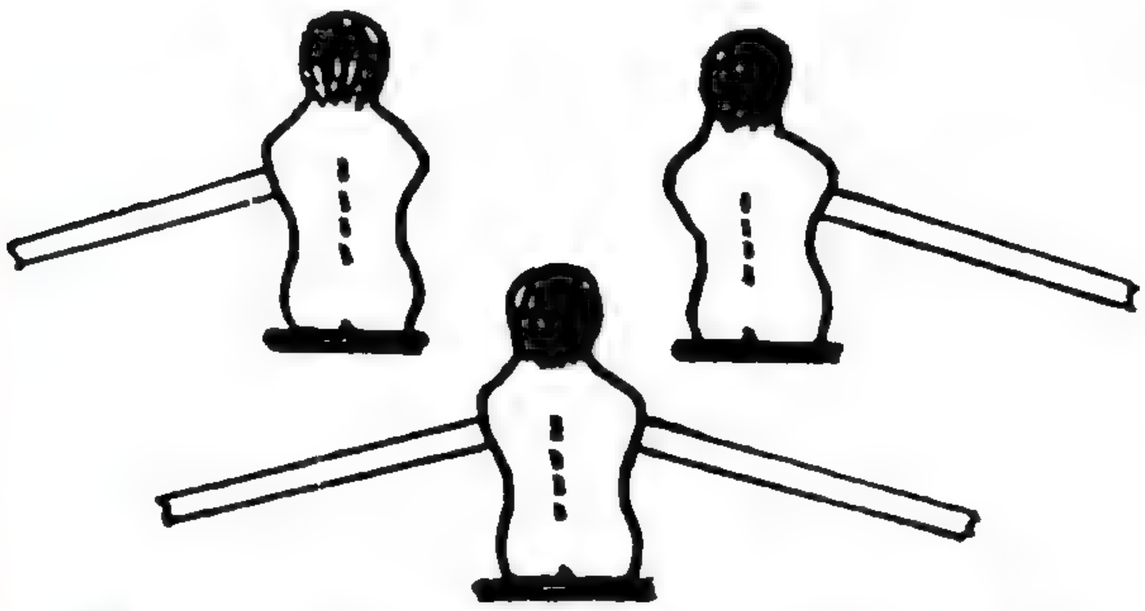

Fig. 9. Rowing arrangements for the vessel in Fig. 6 as suggested by the present author.

Four-Banked Systems

Each of the two triple-banked rowing systems just described (Fig. 2 and Fig. 9) would very easily have been developed into four banks. The man who invented either triple-banked system might (given a suitable hull) have produced the corresponding four-fold system the same afternoon. It is known from Plutarch (*Life of Cimon*, XII 2) that the triremes which fought at Salamis in 480 B.C. were afterwards widened. To widen a triple-banked vessel with oars arranged as in Fig. 2 would make room for a fourth row of oarsmen. After widening, I suggest that Athenian triremes were

usually, though not always, rowed with four banks of oars; and that the earlier, two-level trireme (Fig. 9) also developed into a ship usually rowed with four banks of oars as in Fig. 8. Thus, for the trireme problem I put forward the following solution:

a. Triremes were originally triple banked, some using the system in Fig. 9 and others the system in Fig. 2.
b. Later triremes were slightly wider, with width enough for four banks of oars, each ship using one of the two systems developed from the two types of triple-banked ships.
c. The full crew of a later trireme consisted of:
   30 officers, petty officers and marines
   120 oarsmen, the three classes or grades sitting forward, amidships and aft
   50 *hyperesia*, a support group under the orders of the *pentekontarchos* (= captain of fifty).

Comparison

Now to compare the evidence concerning triremes with:

a. my solution to the trireme problem
b. the six-banked solutions, and in particular with the *Olympias*, the replic ship described in Morrison and Coates, 1986 and 1989.

No one piece of evidence proves anything: it is always possible to beat down evidence by postulating error on the part of the ancient artist or author. But each piece of evidence suggests, even if it does not prove, that my solution is correct, so that the accumulation will, I hope, be enough to persuade an open mind. The evidence is in italics.

There are no representations dating from the trireme era of oars at three levels.

This suggests that triremes did not have oars at three levels. The replica *Olympias* militates against Professor Morrison's idea (1968, 169) that triremes were so difficult to draw that ". . . artists in general had been avoiding the task." Drawing the *Olympias* presents no difficulty to modern artists. Posters advertising the ship show oars at three levels with complete clarity. If there is any doubt about it, trials should be undertaken to establish how many commercial artists, if offered their usual fees, would avoid the task on the grounds that the ship was too difficult a subject to depict.

There are representations dating from the trireme era of triple-banked ships.

The representations of triple-banked ships correspond perfectly as to time and place with what the ancient historians say about the introduction of triremes: first the two-level type (Fig. 6, 9 and 10) which seems from both the written and pictorial evidence to have been invented by the Phoenicians in the 8th century B.C., and then the Athenian type from the early 5th century B.C. (Fig. 1-5).

The Greek language is far older than complicated rowing systems.

For many centuries Greek oarsmen, like modern seamen, had only to distinguish a single-banked from a double-banked boat. In that simple era, it is probable that they described a single line of oarsmen after the number one, and two lines after the number two, as Greek, Italian, French, Spanish, German and English-speaking seamen do today. Before multi-level ships had been thought of, it is improbable that a double-banked boat would have been named after the number one on the grounds that (like every other boat in the then world) it had its oars at one level, or that a boat with one oarsman on every bench would have been named after 0.5 (a half).

Ancient historians make no mention of a type of warship intermediate between the 50-oared ship with two oarsmen on each of 25 benches, and the trireme.

My solution requires no intermediate types. Six-banked solutions do.

The word dieres *is absent from ancient literature until the Roman period.*

The word *dieres* described some two-fold rowing system, in the same way that *trieres* (trireme in English) described a three-fold system. If it described four-banked, two-level ships (as the six-banked trireme theory requires) its absence is extraordinary, as all modern writers on the subject (e.g. Morrison and Coates, 1986, 32) find two-level ships remarkable. If, on the other hand, *dieres* means (as my theory requires) the commonplace arrangement of a port oarsman and a starboard oarsman on each bench, then its absence is not remarkable. This simple arrangement can be assumed unless the ship-type name implies something more complicated.

A type of merchant vessel called a phaselos *could be converted in an emergency into a* phaselos trieretikos.

The word *trieretikos*, like the Greek and Latin words for trireme, implies a three-fold arrangement. No one supposes that a *phaselos trieretikos* had six banks of oars (Casson 1971, 168). The likely explanation is that an ordinary merchant *phaselos* was double banked and became *trieretikos* when a third bank of oarsmen was added down the middle, like the modified the naval cutter in Fig. 3.

The tetreres *(quadrireme in English), named after the number four, was the first type of warship to have had oars worked by more than one man.*

The innovation is likely to have been introduced in its simplest possible form: I know only too well how hard it is for a radically different idea on how to row ancient warships to gain acceptance. As Professor Morrison (1968, 291) said: "The *tetreres* could then have had four men to each 'room' . . . rowing two men to each of two oars." A *tetreres* like that supports my theory. Professor Morrison no doubt meant to write eight men and four oars to each room, as the six-banked trireme theory requires. But that is too complicated to have been the first effort.

In Italian, a double-banked boat is said to have doppio ordine di remi.

The word *doppio* implies the number two, and the word *ordine* implies lines. This suggests that the Latin word *ordo* used in connection with rowing meant one line, as required by my theory, not two lines as the six-banked trireme theory requires.

In modern Greek, a double-banked boat is called diplokopos.

The prefix *diplo* implies the number two. This suggests that the ancient Greek *dikrotos*, in which *di* also implies the number two, also meant double-banked, as my theory requires, not four-banked, as the six-banked trireme theory requires.

One of the trireme's officers was the pentekontarchos, *whose title implies that he was the leader of 50 men.*

Six-banked trireme theories have no group of 50 men, and admit (Morrison 1968, 268) that the title *pentekontarchos* is ". . . completely obscure for a single officer on a *trieres*." My solution to the trireme problem gives the *pentekontarchos* the 50 men that his title implies.

Some part of a trireme's crew was collectively known as hyperesia.

The title *hyperesia* implies a group of people of low status (Jordan 1975, 249). In the six-banked trireme theory, the title has to be allocated to the ship's officers and marines, for which it is unsuitable. In my theory, the *hyperesia* consist of low-status support personnel.

The longest oars in an Athenian trireme were 4.4 m long.

That is a very suitable length for the longer oars in a vessel rowed triple-banked as in Fig. 1-3. In a vessel like the *Olympias*, much longer oars would be better for the rowers on the top level. In the 1987 sea trials "The steep angle of the oar made pulling it awkward" (Morrison and Coates, 1989, 40). A longer oar would have given a shallower angle and so have been less awkward. In Venetian galleys, with rowing crews seated about as far above the water as the top-level rowers in the *Olympias*, they used oars more than twice as long.

If there is any doubt that longer oars would suit the *Olympias* better, the question should be settled by trials.

Only two lengths of oar were used in Athenian triremes.

This is what one would expect in a vessel rowed Siren-Vase-fashion (Fig. 1-3) or in a four-fold development of it. It is not what one would expect in a vessel rowed at three different levels. "That the oars of a *trieres* should vary in length according to the oarsman's longitudinal position in the ship rather than according to his vertical distance from the waterline is surprising . . ." (Morrison and Williams, 1968, 290).

Triremes used as horse transports retained 60 oarsmen and carried 30 horses.

These numbers fit exactly by reconstruction of a trireme as a ship of 30 "rooms": when used as a horse transport there were a port oarsman, a starboard oarsman and a horse in each "room." The same number of oarsmen and horses could be put into the supposed three-level, 170-oared trireme, but without exactness of fit.

Triremes used as troop transports carried about 72 soldiers.

It has been calculated that each troop-carrying trireme that sailed from Corcyra on the expedition to Sicily took about 72 soldiers as passengers (Morrison

and Williams, 1968, 248). At that time, Athenian triremes in their primary role as warships carried 14 soldiers or marines on deck above the oarsmen. If the transport triremes retained 60 oarsmen, there would according to my theory have been 60 vacant oarsmen's places available for passengers. With another 14 passengers on deck, the total of 74 is close enough to the calculated 72, based on the overall numbers of ships and troops.

On the other hand, 72 passengers is far too few for a ship like the *Olympias*, with seats for 170 oarsmen and room below decks for a great many passengers.

The capital ship that preceded the trireme was the pentekontor.

Nobody doubts that the *pentekontor* originally had two oarsmen on each of 25 thwarts. In order to provide a link between this sort of ship and the supposed six-banked, 170-oared trireme, current theories assume another sort of *pentekontor* with four oarsmen to each room. No such development is mentioned by any ancient author. Quite apart from that difficulty, a 50-oared ship of 13 rooms is clearly inadequate as a link with the supposed 170-oared trireme with over 30 rooms. This is not a new opinion or mine alone. Anderson (1962, 5) made the point in his book *Oared Fighting Ships*. The difficulty was ignored in 1968 in *Greek Oared Ships*. I included it in an article in 1976, and it was ignored in Professor Morrison's reply in 1978. It was, I think, ignored in the discussions which preceded the building of the *Olympias*.

By contrast, there are no improbabilities in the evolutionary sequence that I suggest.

Conclusion

It may seem shocking to conclude that centuries of scholarship have given an entirely wrong answer to the trireme problem, while two minutes spent looking up the meaning of "double banked" in the *Oxford English Dictionary* (or the equivalent phrase in a German, French, Spanish, Italian or modern Greek dictionary) indicates the right answer.

But there will be advantages. We need no longer believe that the triremes which Athenian shipwrights could build in such numbers and Athenian seamen row with such immortal success, were too difficult for ancient artists to portray. Nor need we continue to believe that the two-level ships which artists of the trireme era painted so often and with such obvious delight, were completely ignored by their contemporary authors. The maritime history of the period need be no more contrary or paradoxical than history in general.

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The author has recently retired from the Sultan of Oman's Navy, after thirty years service in the British Royal Navy. During his naval service he was able to observe the traditional boats of the Mediterranean and Middle East before they adopted outboard motors, and has written a number of articles comparing them and their methods of rowing with ancient representations of ships. He has taken part in archaeology under water, carried out experimental archaeology and obtained a number of traditional craft for exhibition in museums. Currently, he is trying to raise support for building a replica 50-oared Greek warship.

The Philadelphia Steamboat of 1796[1]

MELVIN H. JACKSON

GRIFFIN Greene, Elijah Backus and their ill-fated steamboat venture first came to my attention in June 1966 during my tenure as Curator of Maritime History at the National Museum of History and Technology,[2] Smithsonian Institution. My colleague, John H. White, Jr., Curator of Transportation, placed a thin sheaf of 13 documents on my desk with the observation that they had come to him as part of a gift of papers relating to early Ohio railroad history and were certainly of maritime interest.[3] This paper is concerned with those 13 documents and what they tell in the reconstruction of the events surrounding the building of an early steamboat, the engine that powered it, and the forces that contributed to its conception and failure.[4]

While the name of Elijah Backus (1759-1811) and the dates found among the manuscript materials led to the speedy identification of the steamboat with one contained in the list of patents granted by the United States government,[5] they also brought to the fore the name of Griffin Greene (1749-1804) as the actual inventor and projector of the Philadelphia steamboat (Figure 1).[6]

Greene left no trace in Philadelphia, "Steamboat Capital" of the New World, in spite of the fact that the enterprise covered a period of about eight months. No mention of Greene's project has yet been found in the archives of the American Philosophical Society in Philadelphia, many of whose members followed the development of steam navigation with great interest.

The year 1796 appears to have marked a fallow period in the evolution of American steam navigation. John Fitch, James Rumsey and their squabbling over the priority of invention of the steam engine had passed from the scene. Nicholas Roosevelt and John Stevens were two years away from building their first experimental steam engine at Red Hook, New Jersey and were still arguing about the effectiveness of the horizontal paddlewheel; Stevens was not to suggest the stern wheel until 1799. In New York, Robert

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1. This study was among the papers of Melvin H. Jackson in the Division of Transportation, National Museum of American History, Smithsonian Institution. It was first presented in September 1979 at the Third International Reunion for the History of Nautical Science and Hydrography, held at the National Maritime Museum, Greenwich, London. Dr. Jackson originally intended to publish a monograph on the subject, but it was not completed prior to his death. With the kind permission of Mrs. Melvin H. Jackson, the paper was supplemented, edited and illustrated by Paul Forsythe Johnston.

2. The museum's name was changed to the National Museum of American History in 1980.

3. The 13 documents, hereafter referred to as the Greene-Smithsonian Papers, were donated to the Smithsonian Institution by the Martha Kinney Cooper Ohioan Society of Columbus, Ohio in June 1966, through the courtesy of Mr. Walter Rumsey Marvin, Executive Director of the Society. When I contacted Mr. Marvin by telephone on 21 December 1966, he was unable to shed light on the papers' provenance; they had simply appeared on his desk one day. Since the Ohioan Society was primarily interested in the literary works of Ohioans, Mr. Marvin, recognizing their significance, sent them to Mr. John H. White, Jr.

4. Thanks are due to Mrs. Josephine E. Phillips for sharing her encyclopedic knowledge of the history of Marietta, Ohio and for directing research towards other sources of information about both Griffin Greene and Elijah Backus. Mr. Richard K. Showman generously provided notices of Griffin Greene from the manuscript material of the *Nathaniel Greene Papers*, of which he is editor for the Rhode Island Historical Society. Messrs. Donald Holst and John W. Schultz of the Smithsonian's model studio interpreted the manuscript sketch and constructed the operating model of the Greene engine. Mr. James Knowles of the Division of Transportation designed and built the model hull into which the engine was installed and which is presently on display in the Hall of American Maritime Enterprise.

5. *Letter from the Secretary of State Accompanied with a list of names of Persons who have Invented . . . and to whom Patients have been issued for the Same.* Published pursuant to the resolution of the House of Representatives, dated 23 January 1805, p. 11: "New invented steam engine and boiler. Elijah Backus, Mar. 31, 1796."

6. This fact is corroborated by an obscure biographical sketch that appeared in Samuel P. Hildreth, *Lives of the Early Settlers of Ohio* (Cincinnati: Derby, 1852), pp. 279-80. It is curious that in spite of Hildreth's mention of Greene as a steamboat experimenter, Greene's name is nowhere mentioned as one of the pioneers of American steam navigation—not even among that shadowy group of steam tinkerers that includes Morey, Reade, Ormsbee, Henry, Sullivan and others.

Griffin Greene

Fig. 1. Lithograph of Griffin Greene (1749-1804), after an oil portrait in the Campus Martius Museum, Marietta, Ohio. From Samuel P. Hildreth, *Biographical and Historical Memoirs of the Early Pioneer Settlers of Ohio* (Cincinnati: Derby, 1852), following p. 260.

Livingston was still a year away from serious consideration of steam navigation as a field for investment. It would not be until 1802 that Robert Fulton would contract for the Hudson River steamboat that would become famous as the *Clermont*.

Yet the year 1796 held new promise for the rise of steam transportation on the Ohio River. James Rumsey's grant of exclusive rights on Virginia's waterways had expired, freeing a long stretch of the Ohio for new entrants into the steamboat field. The 1795 Treaty of Greenville, through its delineation of settler and Indian rights, promised to end the dark era of Indian warfare against the settlers and their trade from Pittsburgh to Louisville.

During the Farmers' Castle days, when the settlers live in a virtual state of siege, Griffin Greene, former forge master of the Potowomut anchor works at Coventry, Rhode Island, took up Ohio lands and settled in Belpré in 1789. There, he met Elijah Backus of Norwich, Connecticut, when Backus, owner of the Yantic Iron Works in Norwich, purchased an island in the Ohio River opposite Belpré in 1790. It was during this period of constricted activity that Greene displayed a familiarity with mechanics in the building and operation of a floating grist mill. In conjunction with the frontier boatbuilder and tinkerer Jonathan Devol (1756-1824), he also experimented with a perpetual motion machine, whose mechanism they sought to adapt to a boat poling machine much as James Rumsey had tried earlier.

It was very likely when the prospects of peace and rapid population growth loomed bright that the concept of a steamboat offering rapid and secure communications with the eastern market took form. Greene and Backus entered a partnership for the purpose of building a steamboat, Backus to receive a controlling seven-twelfths interest in the venture and the patent rights in exchange for his financial backing.[7]

Exactly when Griffin Greene started actual work on the project in Philadelphia is difficult to pinpoint. It is known that by 19 April 1796, the date of the earliest manuscript document among the Greene-Smithsonian Papers, the construction of the first engine (probably a small pilot model) was well underway. Thus, the month of January is likely for the initiation of work. By 18 May, the pilot model must have been tried and proven successful. On that date, Backus and Greene entered into a contract with John Patterson, who undertook to build what certainly must have been the full-sized steamboat (Figure 2). A letter written on 19 May by Greene to his wife Sally provides an interesting note about Patterson: he was, Greene wrote, "the man that built the Great Steam Engine at London Bridge."[8]

7. In a document dated 2 June 1796, Elijah Backus conveyed to Griffin Greene seven-twelfths of his rights in the steam engine. Hildreth Collection, Dawes Memorial Library, Marietta College, Marietta, Ohio. Volume 3, No. 109.

8. Letter from Griffin to Sally Greene, dated 19 May 1796 at Philadelphia City. Hildreth Collection, Volume 3, No. 127. In answer to a query of 21 January 1967, Mr. R. J. Law, (then) Assistant Keeper, Department of Mechanical and Civil Engineering at the Science Museum, London, confirmed and provided citations for the existence of an atmospheric engine at London Bridge erected prior to

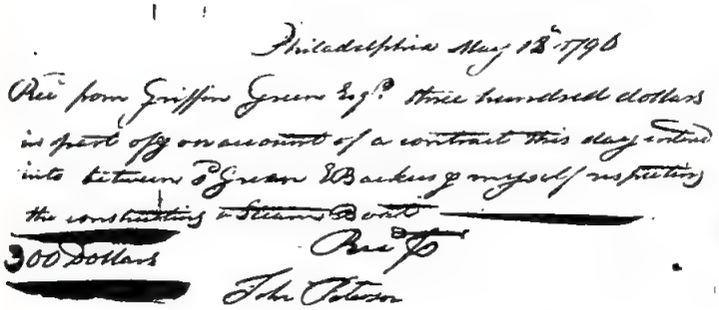

Philadelphia May 18th 1790
Rec'd from Griffin Greene Esq.r three hundred dollars in part of payment on account of a contract this day entered into between Greene & Backus & myself respecting the constructing a Steam Boat
300 Dollars
John Patterson

Fig. 2. Dated 18 May 1790 at Philadelphia, this agreement between John Pat[t]erson and Griffin Greene records a down payment of $300 for the construction of a steamboat. From the Greene-Smithsonian Papers. National Museum of American History Neg. No. 77-12293.

With the beginning of June, the financial magnitude of the project and very probably a growing indebtedness prompted Greene and Backus to take in Joseph Thomas and Samuel Condon as partners; both men had already surfaced earlier as suppliers of materials and workmanship. They were to share one-sixth of the patent rights for the engine in return for underwriting one-sixth of the expenses incurred in completing the vessel. This agreement was modified almost immediately, giving Thomas and Condon a one-quarter interest in the venture in return for one half of the expenses.

Despite the influx of fresh capital, costs continued to mount. An undated document among the Greene-Smithsonian Papers, assignable to the period from July to September 1796, indicates that Robert Underhill and Patrick Farrell had become creditors in the amount of $8,059.64; William Bell, Jr., $675.50 and David Easton for $2,341.51. These were large sums for the day. At some time during the month of August, it is likely that these major creditors, among others, forced the enterprise into bankruptcy, attended by the seizure of the boat and engines. A final document dated January 1799 relating to the engine is a power of attorney executed by Greene, empowering Backus to do all things necessary to recover the engine(s) and the boat from John Patterson, and to either deliver them to Marietta or dispose of them as he might see fit. Thereafter, there is no further mention of the steamboat.

1771. The builder of the engine was unknown to him. Whether Patterson was indeed the engine builder seems improbable, but it is quite possible that he worked on it. It opens the question of just how much of Patterson's knowledge of the steam engine might be reflected in the Griffin Greene machine.

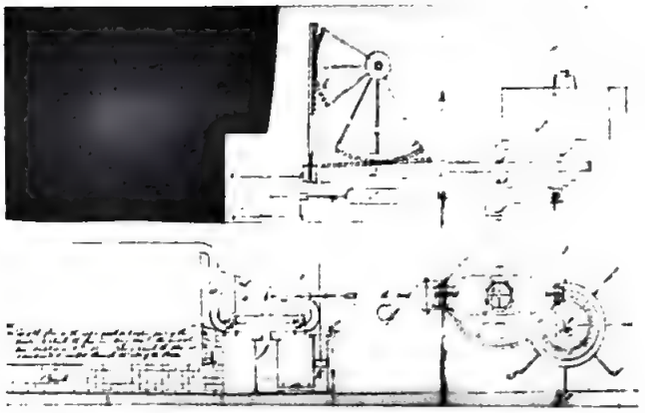


Fig. 3. This drawing of the Greene-Backus steamboat may have been a copy of the original patent drawing. From the Greene-Smithsonian Papers. National Museum of American History Neg. No. 77-12302.

The Drawing

The remarkable drawing included among the Greene-Smithsonian Papers is their most outstanding feature (Figure 3). It is an ink drawing on wire laid paper, watermarked "BUDGEON" and measuring 19¼" by 11¾". Filling the lower length of the sheet is an elevation of the boiler, engine, condenser, vacuum pump, power transmission train and an eight-bucket stern wheel. The middle part of the sheet contains a plan view of the machinery, excluding the boiler. Both illustrations are to the same unspecified scale. In the upper middle part of the sheet is an inset elevation drawing which details the power take off system to drive the vacuum pump. This feature is clearly not to the same scale as the plan and elevation views. All elements are identified by letters or numbers, but the explanatory legend that originally occupied the upper left third of the sheet has been scissored out.

In two instances the machinery materials are specified: the pitman is wooden and the frame of the opposed racks is cast iron. The mouth of the flue is identified, as is the brickwork of the boiler foundation. An explanatory note is written through the boiler.[9] Lack-

9. The legend reads: "Top of the flue or the upper or highest part of the boiler to which the fire has any reach, this middle line supposed to be sheet iron of which the stove is composed (?) and riveted through the side of the boiler."

ing its smokepipe, the boiler appears to be a double flue single pass system, probably fired from its forward end with the flues joining at the point marked "Mouth of the Flue" and passing into the stack.[10]

Before proceeding further, it should be pointed out that while the drawing lacks a specific scale, the careful delineation of the plan and elevation strongly suggests that a scale did exist. An analysis of the component parts, and most especially the ratio of cylinder length to diameter and the length of the piston travel makes a scale of ¾" = 1' likely. This scale yields the following specifications:

Length of cylinder	24"
Diameter of cylinder	18"
Stroke	21-23"
Length of toothed section of racks	24"
Distance between racks	18"
Diameter of driving spur	17+"
Diameter of driven gear	4'2"
Diameter of paddle gear	2'3"
Paddle wheel, tip to tip	5'3"
Boiler length (approx.)	6'8"
Boiler foundation (approx.)	9'6"
Pitman	4'6" × 6"
Condenser	8½" × 21"
Vacuum pump	8" × 19¾"

The distance from the forward edge of the boiler foundation to the center of the paddlewheel shaft is approximately 24 feet. Assuming that the stern wheel was mounted in a stern well, the machinery and its boiler could have been comfortably accommodated in a hull of between 40 and 50 feet. It will be noted that the boiler was probably offset to starboard to counteract the weight of the cylinder and transmission drive, which are shown in the drawing as being to port of the vessel's centerline.

The Engine

The engine itself is so strikingly similar to James Watt's single acting condensing steam engine series in almost every feature, including cylinder diameter and stroke as well as the rack and sector driven vacuum pump, that mere coincidence is unlikely (Figure 4).

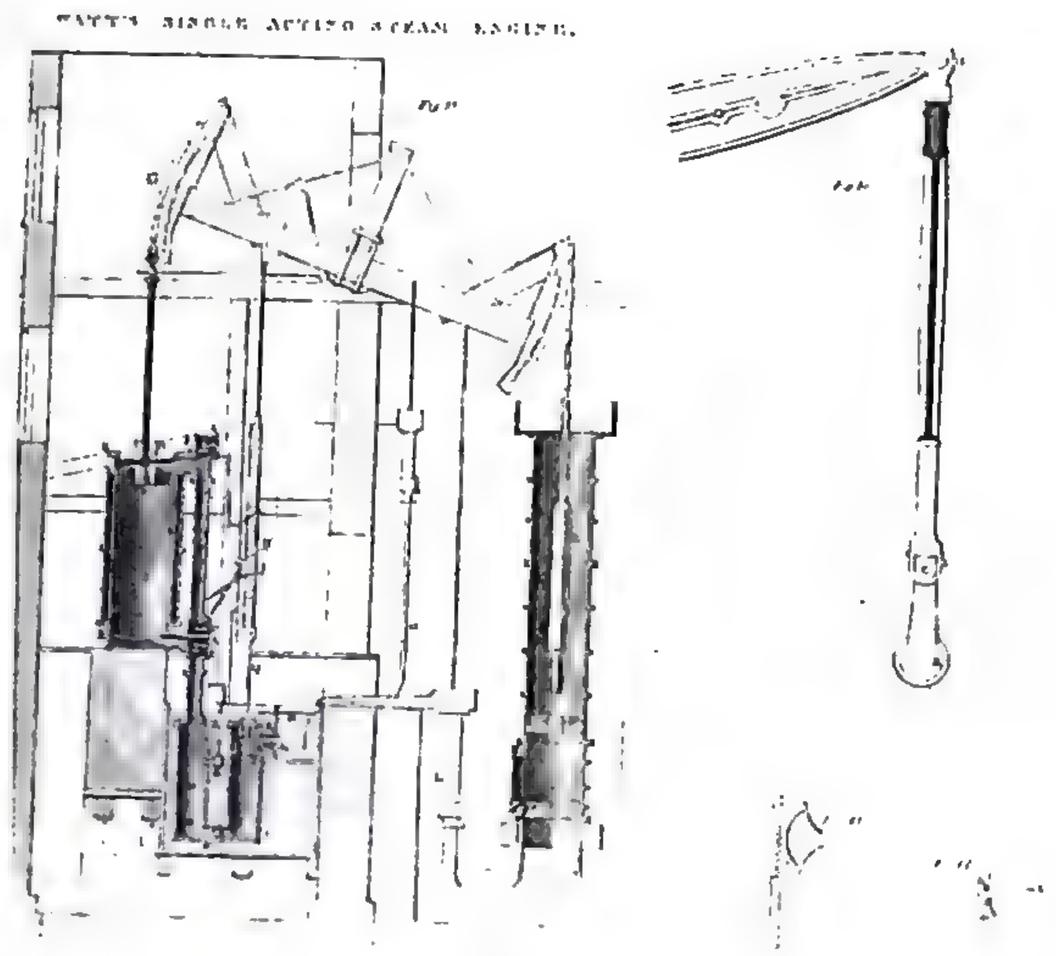


Fig. 4. James Watt's single acting steam engine. From Dionysius Lardner, *The Steam Engine Familiarly Explained and Illustrated* (Philadelphia: E.L. Carey & A. Hart, 1852), Plate 4.

The only unique feature is the power takeoff from a rack on the pitman.

While details of the intake and exhaust steam valves are not shown on the drawing, the letters *M* and *N* indicate that a poppet or butterfly valve system (again, like Watt's) was intended. The valves were probably actuated by a rod from the pitman. Similarly, the letter *R* very likely represents a foot valve to let water into the condenser (which was to be set into a tub) on the upstroke of the vacuum pump, which then evacuated the heated water through the pipe *I*.

How fine adjustments to the steam valves were to be made is open to conjecture, but several systems suggest themselves. Actually, there is no problem here since Watt's engines of this period were not expansive—the steam and exhaust valves were linked directly together. It was not until the beginning of the nineteenth century that Murdock's eccentric gearing made early closing feasible.[11]

10. When the model was built from this drawing, the significance of this legend was not appreciated. Hence, the stack appears at the forward end of the boiler with the fire door appearing where the flue emerged.

11. Henry W. Dickinson and Rhys Jenkins, *James Watt and the Steam Engine* (Oxford: Clarendon Press, 1927), p. 126.

Transmission Gearing

The most arresting feature of Greene's machinery is its power transmission, which converts the reciprocating linear stroke of the piston to rotary motion at the stern wheel. This element is drawn with great clarity but leaves unstated the supporting structural framework beyond indicating that both the rack frame and pitman were to be carried by roller sheaves. Such structural details, of course, could be logically left to the talents of a competent millwright.

The double rack and interrupted pinion system of converting rotary to linear motion was quite old and was widely employed in double acting pumps in Europe, and to a much lesser extent in England. In 1588, Agostino Ramelli shows it in many guises,[12] and it appears in edition after edition of Ramelli-derived works on machine building. Its use, however, seems to have been confined to relatively small machines. The precision required in its manufacture might well have discouraged its use in larger machines,[13] considering the retarded state of the art of metal gear fabrication in the last quarter of the eighteenth century. But the strongest reason for its disuse in pumping operations must be laid to the development of the atmospheric steam engine, whose vertical stroke favored the employment of direct linkage with the rod of the piston pump. Greene merely reversed the driving and driven ends.

The double rack, but with racks offset driving a pair of dully toothed pinions and utilizing a system of ratchet detants, can be found as late as 1802 in Desblanc's elaborate steamboat (Figure 5). Papin, in his rather vague specification of 1687, seems to refer to the same system, while in America James Rumsey called for much the same mechanism in his water-driven hopper mills in his British patent specification of 1790 (Figure 6). Similarly, a ratchet drive was used in the 1783 French steamboat *Pyroscaphe* by the Marquis Claude de Jouffroy d'Abbans (Figure 7), and Samuel Morey appears to describe the same system in his steam car of 1793. The arrangement was also applied (unsuccessfully) to the first version of the Peter Cooper

12. Agostino Ramelli, *Le Diverse et Artificiose Machine . . .* (Parigi: In Casa del'Autore, 1588) passim.

13. Among the best descriptions of and commentaries on the double rack and interrupted gear drive is that of W. Salzenburg, *Vorträge über Maschinenbau* (Berlin: n.p., 1842). On p. 249, Salzenburg writes: ". . . this device can only be used with light motions and has to be made very accurately."

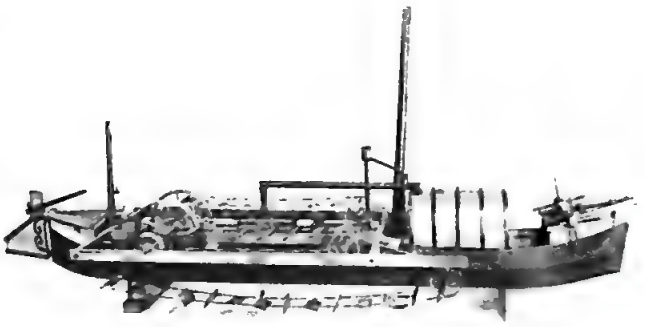


Fig. 5. Model for a steamboat proposed by Desblancs in 1802. Courtesy of the Musée du Conservatoire National des Arts et Métiers, Paris.

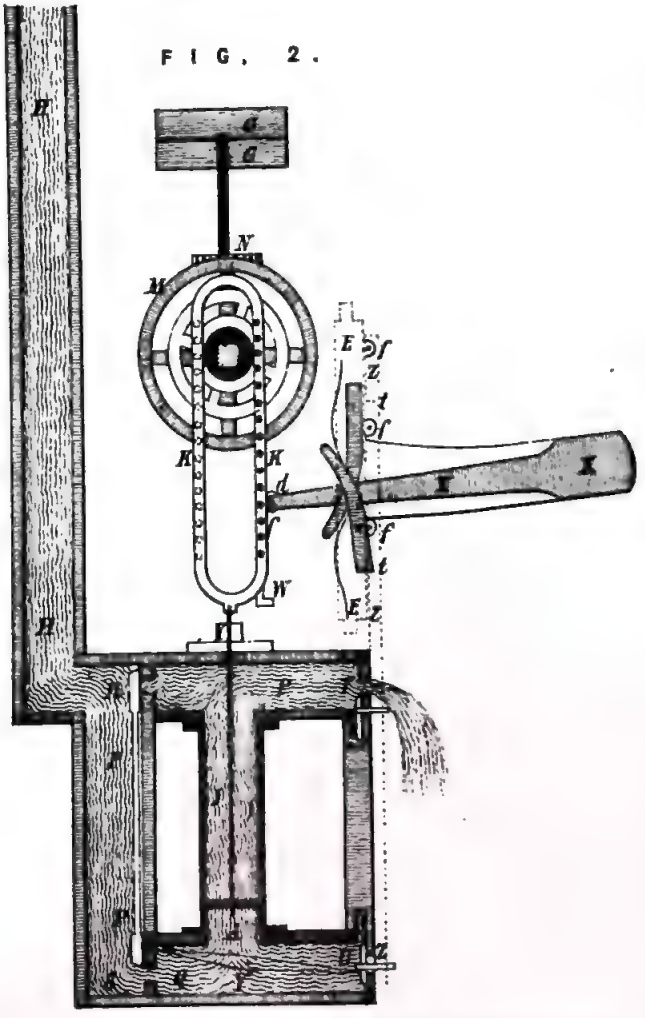
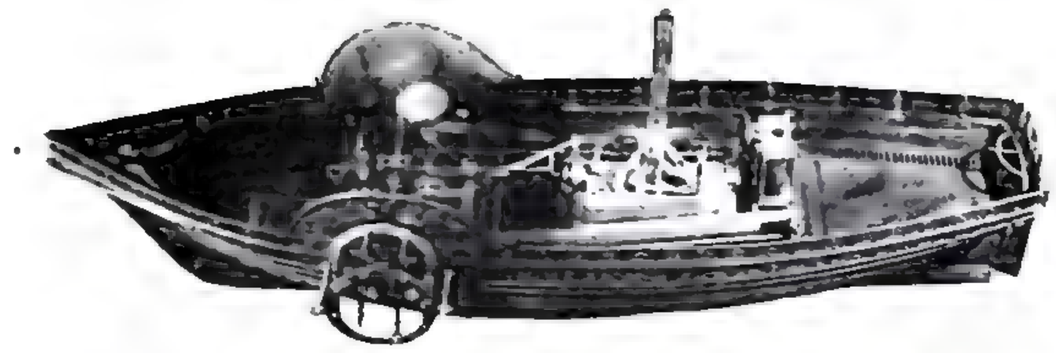


Fig. 6. James Rumsey's 1790 British patent specifications for a water-driven hopper mill included a mechanism similar to the Greene-Backus steamboat transmission. From James Rumsey, "Applying Water and Steam Power to Machinery, to the Propulsion of Vessels, &c.," *A.D. 1790 . . . No. 1738* (London: [British Patent Office] George Edward Eyre and William Spottiswoode, 1855), Figure 2.



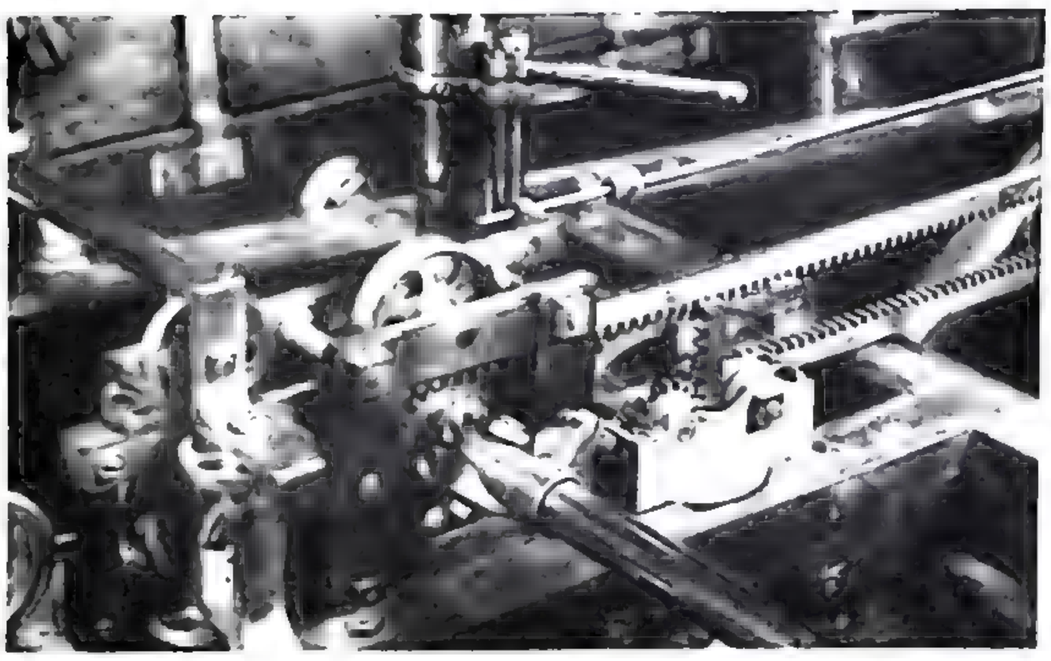


Fig. 7. The Marquis Claude de Jouffroy d'Abbans (1751-1832) submitted this 1:24 scale model of his second steamboat *Pyroscaphe* to the French Académie des Sciences in 1784. The detail shows the piston rod connected to a double ratchet mechanism. Courtesy of the Musée de la Marine, Paris.

locomotive of 1829/30, a test engine for the Baltimore and Ohio Railroad.[14]

It is tempting to speculate on the source of Greene's design for his unusual transmission system, but space precludes any consideration in depth beyond the observation that Greene displayed undoubtable mechanical ingenuity in raising the British 32-gun frigate *Flora* of 698 tons (British Measurement). This vessel was scuttled by the British in early August 1778 to block the approaches to Newport, Rhode Island, when the port was threatened by a combined Franco-American attack. In 1780, Greene constructed a gang of six force pumps capable of pumping no less than 2,400 hogsheads of water per hour, driven by a horse mill mounted on a barge. The actual raising of the wrecked frigate took no more than six hours once the hull was prepared by divers.[15] Did his pumps employ

14. John H. White, Jr., pers. comm., 10 October 1989.

15. The operation was reported in a letter from Jacob Greene to Nathaniel Greene, dated 13 July 1780 at Coventry, Rhode Island. Princeton University Library, courtesy of Mr. Richard K. Showman. It is also described in Hildreth, *ibid.* p. 287.

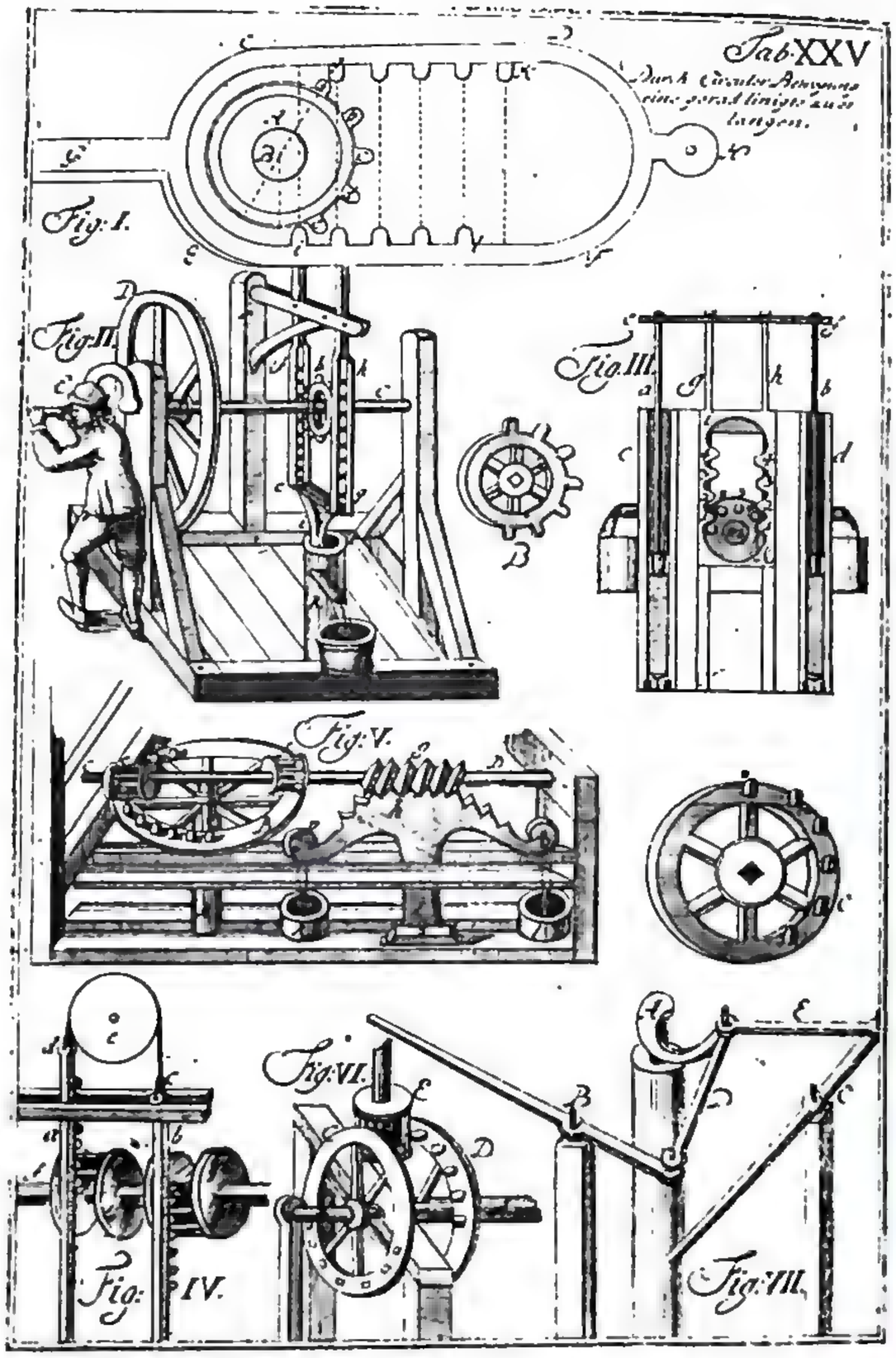


Fig. 8. Jacob Leupold's illustration of the double rack interrupted gear, from the 1774 edition of his *Theatri Machinarum Hydraulicarum*.

the double rack and interrupted gear? Perhaps he had become familiar with one of the variations of the interrupted gear train from the Potowomut Forge's trip hammer.

The considerable numbers of published works on mechanical contrivances also suggest that Greene, who was noted as possessing a considerable library, might have modelled his machine after an illustration in Jacob Leupold's *Theatri Machinarum Hydraulicarum* (Figure 8).[16] Leupold has inserted a crisp, carefully

16. Jacob Leupold, *Theatri Machinarum Hydraulicarum* . . . (Leipzig: Kosten Bernhard Christoph Breitkopfs und Sohn, 1774). Volume 2, Plate 25. The illustration is labelled: "A machine that through circular movement produces a straight movement and is used by many instead of a crank."

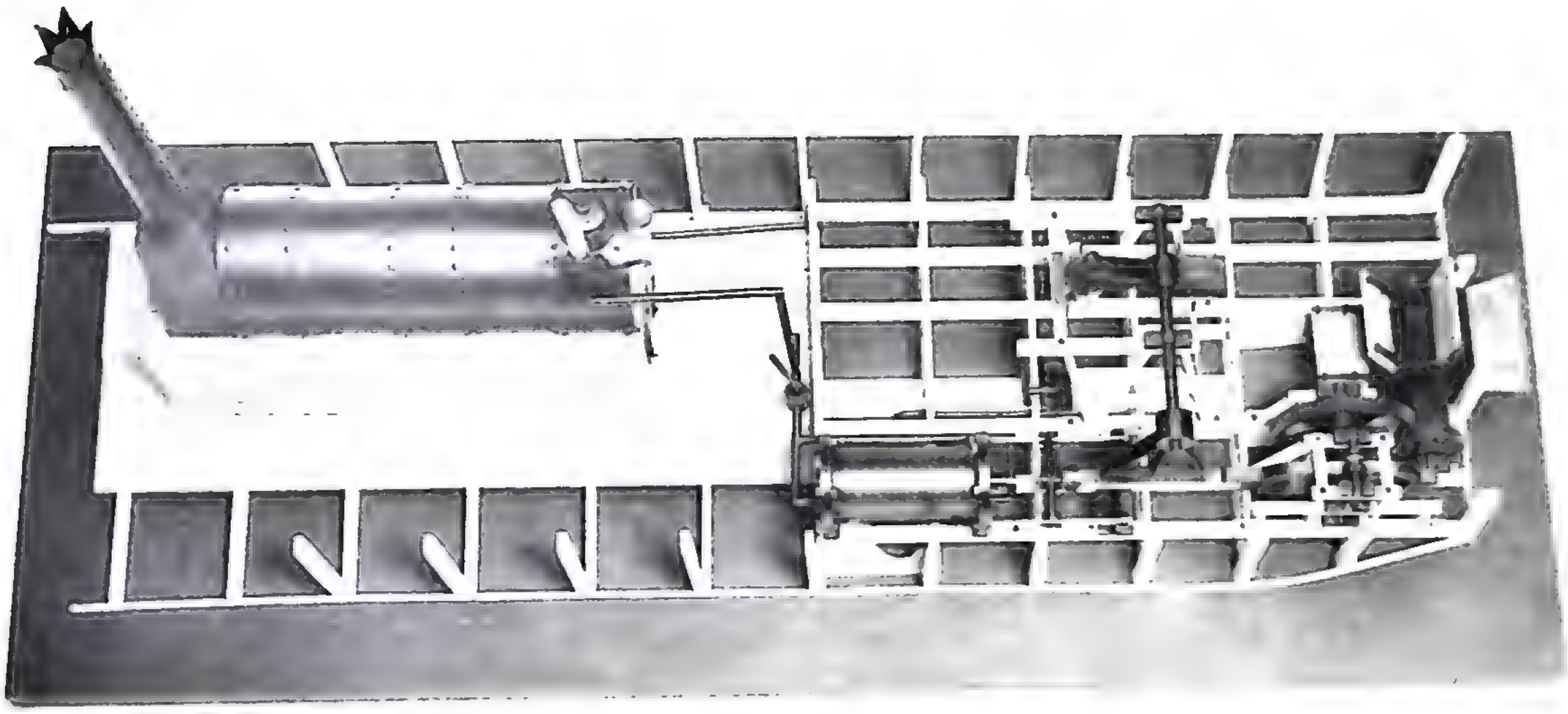


Fig. 9. Model of the Greene-Backus steamboat machinery. National Museum of American History Neg. No. 71493.

executed copper engraving, at startling variance with the tired old woodcuts, of the double rack interrupted gear. Its resemblance to Greene's drawing is intriguing.

In 1967, a working model of the Greene steam engine was built by the National Museum's model studio to the scale of ¾″ = 1′ (Figure 9). A supporting framework for the machinery was devised; likewise a valve gear consonant with contemporary practice was added. When powered by compressed air, the engine performed quite credibly, although (as had been expected) there was difficulty in starting the engine with the interrupted gear at either extremity of the rack frame. But with the pinion at mid-rack, the model started up easily and went through its evolutions, including reversing, with surprising smoothness.

Would such smoothness have carried over to the full-sized engine? It is hardly likely. The sloppy tolerances in large machinery gearing would have placed a great strain on racks and pinion. The irregularity of the engine stroke would certainly have caused hesitation at the end of each stroke, in spite of the inertial effect provided by the pair of iron bands on the paddlewheel and the weight of the iron rack frame. However, it

Fig. 10. Model of William Symington's 1802 steamboat *Charlotte Dundas*. Courtesy of the Trustees of the Science Museum, London.

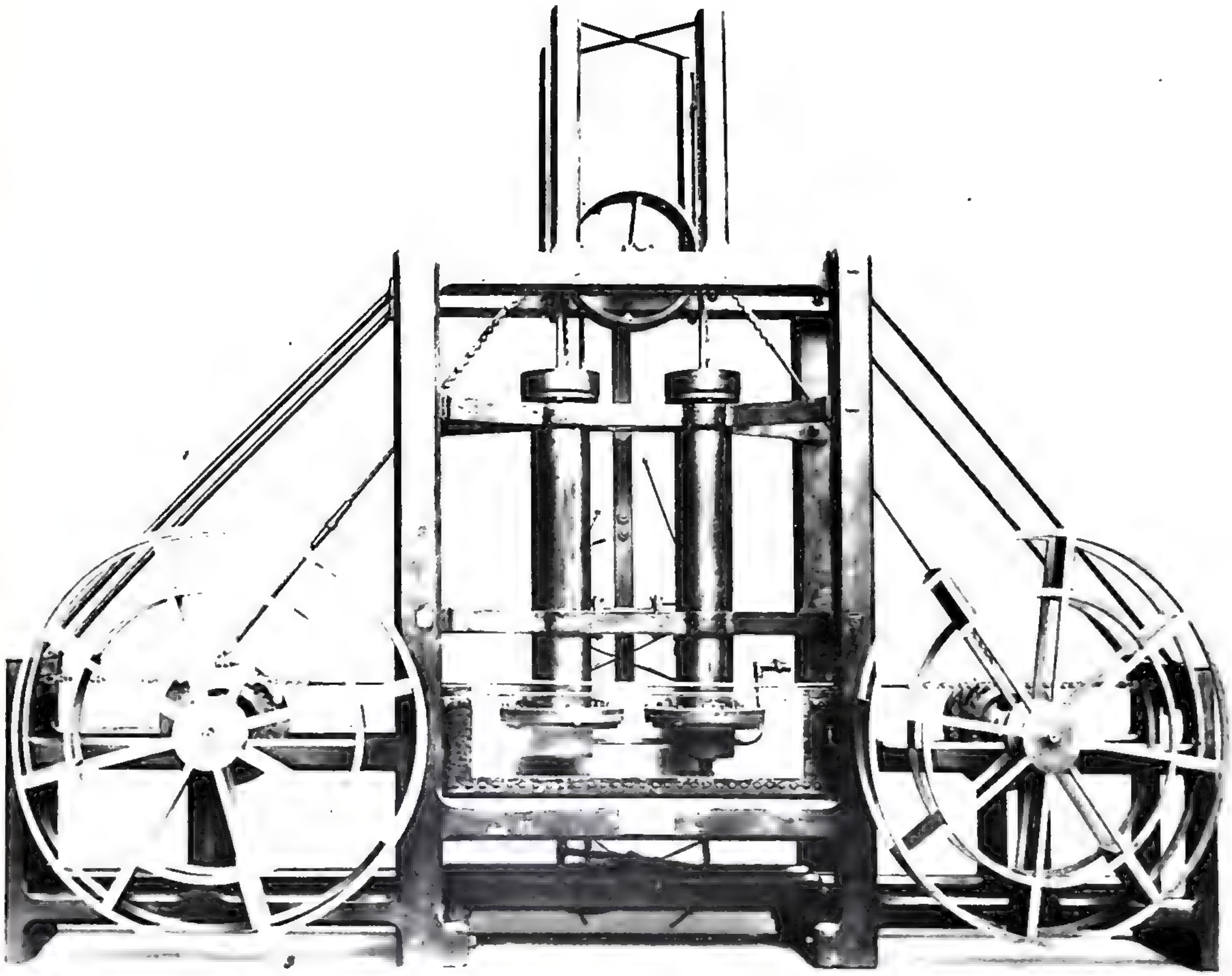


Fig. 11. William Symington's 1788 marine steam engine utilized a complex system of ratchets driving serial paddle wheels; his later designs were simpler. Courtesy of the Trustees of the Science Museum, London.

should be pointed out that these very faults and failings of Greene's transmission were shared by and were common to the single engines of western river steam sternwheelers, and indeed were accentuated with the introduction of the cut-off throughout their long careers. As historian Louis Hunter pointed out, ". . . in single engine boats there was often a perceptible pause at the end of each stroke; the boat moved forward by impulses and much vibration."[17] With Greene's machinery working at 40 strokes per minute installed in a vessel around 50 feet long with a conformation much like that of the model (i.e. a flat-bottom scow type with a sharp bow and open stern well, ballasted to submerge the sternwheel buckets to 30 percent of their vertical surface), there is a potential speed of 5-6 miles per hour at 25 percent theoretical efficiency.

Although Griffin Greene worked outside the mainstream of steamboat experimenters, he was concerned with overcoming those very features that caused Benjamin Henry Latrobe to voice his gloomy doubts on

17. Louis C. Hunter, *Steamboats on the Western Rivers* (Cambridge: Harvard University Press, 1949), pp. 144-45.

the future of the steamboat in 1803, unless the working of the engine was simplified and advances in "dispensing with the beam in converting libratory into a rotary motion were made."[18]

In many respects, Greene's design anticipated the elegant simplicity of William Symington's 1802 steamboat *Charlotte Dundas* (Figure 10) in his use of the stern wheel, horizontal steam cylinder and in the elimination of the cumbersome walking beam and its heavy gallows (which considerably lowered the center of gravity of the vessel's machinery). Unfortunately, Greene remained a prisoner to the peculiar persistence of exotic and complicated motion conversion systems, unlike Symington (Figure 11). Of the workability of the Greene engine there can be no doubt, but the twin specters of under-capitalization and cost overrun put an end to the project, depriving Griffin Greene of a rightful place in the gallery of pioneers of American steam navigation.

18. Benjamin Henry Latrobe, "Improvements in Steam Engines." *Transactions of the American Philosophical Society* VI.1 (1804) 89-98.

Melvin H. Jackson (1914-1983) received his B.A. from the University of Miami and his Ph.D. from Harvard University. A master mariner and teacher, Dr. Jackson succeeded Howard I. Chapelle as Curator of Maritime History at the Smithsonian Institution, serving from 1967 to 1978. He then became Director/Curator of the United States Merchant Marine Academy at Kings Point, New York. Author of numerous articles and the books Privateers in Charleston, 1793-1796: An Account of a French Palatinate *(1969) and* Eighteenth Century Gunfounding: The Verbruggens at the Royal Brass Foundry *(1974), he also edited the seven-volume study* The Historic American Merchant Marine Survey *(1983).*

Paul Forsythe Johnston received his B.A. from Middlebury College and his Ph.D. from the University of Pennsylvania. He served as Curator of Maritime History at the Peabody Museum of Salem from 1982 until 1989, when he was appointed Curator of Maritime History at the Smithsonian Institution.

"A Dangerous Sport": A Boston Boy's Life at Sea, 1820-1837

ALAN ROGERS

ON a cold, snowy day in November 1820, a few weeks past his seventeenth birthday, Moses Adams began his life before the mast as an ordinary seaman for $7 per month. After more than four months of waiting in Boston, he was hired aboard the brig *Rover*, bound for Haiti with a cargo of fish, lumber and a "high deck load of hoops." Until a cook was found to complete the crew, Captain William Stevenson ordered Adams to take on that job. Working in a small, smoke-filled galley where everything was "covered with grease and dirt," Adams made a beef soup that he was too sick to eat. Not surprisingly, he rejected the captain's offer of a full seaman's wages if he would stay on the job. Indeed, when the African-American hired in Boston jumped ship in Haiti, Adams and another youngster—"a Sicilian named Joe"—fought for the right not to be cook on the return voyage. The cheering crew determined that Adams was the winner.[1]

Although Adams often didn't approve of his shipmates' behavior—they were "old, weather-beaten and rum-soaked sorts"—he acknowledged that they taught him a great deal about "the arts and mysteries of seamanship." As it turned out, Adams and the *Rover*'s seamen needed all their skills, for the brig was "old, leaky and in bad order." After unloading the ship's cargo in New Orleans, the *Rover* sailed for Philadelphia. On the passage, the brig sprang a leak and struggled through bad weather before reaching Philadelphia, where the crew was discharged. While Moses was in Philadelphia, he bought a suit ("longtoggs") and went with his shipmates on a "cruise or two" ("not drunken ones on my part") before he signed on the schooner *Delaware* headed for Boston.

Moses arrived home in May 1821. It was, he recalled years later, "just such a voyage as a boy ought to be sent on for the first time, whose friends desire to sicken him at once of the sea. . . ." But Adams knew well that he was a sailor "by necessity," not by choice.[2]

More than twenty years ago David Montgomery challenged historians to write about the life of the working classes in the pre-industrial cities. Ordinary seamen have been the focus of some of the research published since Montgomery's article appeared in 1968. Gary Nash and Billy Smith, for example, have used tax records, wills and pension records to sketch a picture of the urban world of sailors. Their studies show that American sailors moved frequently, were poor and died young. A recent book by Marcus Rediker acknowledges the validity of these generalizations, but argues that once on board ship, sailors became alienated workers who often engaged in collective acts of rebellion against officers and ship owners.[3]

While these historians and others make some use of accounts written by sailors, they are interested primarily in creating a composite portrait of the working class, rather than highlighting an individual voice. Indeed, only a handful of ordinary seaman's journals from the 18th and early 19th centuries have been published in their entirety. The two best examples are: the *Diary of the Life of Jacob Nagle*, written in 1854 when he was 79 years old and published for the first time in 1988; and *Ned Myers*, an as-told-to biography written

1. Moses Adams, Common Place Book, 2 vols. (John J. Burns Library, Boston College), II, 49-51.

2. *Ibid.*, pp. 51-53. The *Rover* was built in Salem in 1798; *The Diary of William Bentley, D.D., Pastor of the East Church, Salem, Massachusetts*, 4 vols. (Salem, 1914), II, 291.

3. Gary Nash, *The Urban Crucible: The Northern Seaports and the Origins of the American Revolution* (Cambridge, Massachusetts, 1986), pp. 38-39, 150-154, 208-209; Billy Smith, "The Material Lives of Laboring Philadelphians, 1750-1800," *William and Mary Quarterly*, 3rd ser., XXXVIII (1981), pp. 190-192; Marcus Rediker, *Between the Devil and the Deep Blue Sea: Merchant Seamen, Pirates, and the Anglo-American Maritime World, 1700-1750* (Cambridge, England, 1987).

by James Fenimore Cooper in 1843. Both Nagle and Meyers recount their adventures at sea in a colloquial style that focuses on the "wrecks, battles, escapes, and career of a seaman. . . ." Ned Myers, for example, described his 35 years at sea as "head gales, a head beat sea, sails split and spars carried away." The significance of these pieces is twofold: they allow us to see major historical events through the eyes of the men in the forecastle, rather than the quarterdeck; and they provide a source of anecdotes and details about life before the mast.[4]

Moses Adams' journal does this and more. His unpublished journal is a unique source because it may be used as a lens through which we may glimpse the values and beliefs of an ordinary sailor in the early 19th century. Written in a clear, neat hand and in a prose style that bears the mark of formal education, Adams' Common Place Book is organized in chronological order from 1813 to 1835 and often annotated in a way that suggests a remarkable historical consciousness. The two volume manuscript into which Adams copied letters he received and sent to family and friends, bits of poetry and prose, and his retrospective thoughts and feelings over a period of 22 years forms a full and intimate memoir. Adams' journal, therefore, makes it possible to construct a narrative of his life and, more importantly, to probe the public and private worlds in which he lived.

Moses Adams was born in 1803 in Ellsworth, Maine, a small riverport and logging center then a part of Massachusetts. Until 1815 he and his three brothers and a sister enjoyed a happy, comfortable middle-class family life. Moses' father (also named Moses) was one of a handful of college graduates and professionals in the District of Maine. After completing Harvard College, the elder Adams studied medicine before he and his young bride moved to Ellsworth in 1800, where he began his practice. In 1811 Dr. Adams was elected to the Massachusetts legislature as a Federalist and the following year he was appointed High Sheriff of Hancock County by Governor Caleb Strong.[5]

On May 12, 1815, Dr. Adams' world collapsed. His wife, Mary, was brutally murdered. The Adams' seven-year-old daughter discovered the body of her mother sprawled on the kitchen floor in a pool of blood. An axe lay near her body. The little girl ran crying to her neighbors who sent somebody to tell Dr. Adams the terrible news.

While some evidence seemed to lead to the conclusion that a thief had robbed the home and then killed Mrs. Adams in order to escape detection, a grand jury convened two days after the murder concluded that it had reasonable cause to believe that Dr. Adams had murdered his wife. After a tumultuous five-day trial before the Supreme Judicial Court, Dr. Adams was acquitted, but he gave up his medical practice, abandoned his home and scattered his children to family and friends. Young Moses Adams was sent to Boston "to serve [his] time" as an apprentice in the mercantile firm of Peters and Pond. Cut loose at the age of 13 from the love and security of a prosperous rural family and deeply troubled by the brutal death of his mother, Moses was forced to confront an entirely new life alone. "Now Moses, you are Captain Peters' boy," his father told him in June 1816.[6]

For the next two years Moses struggled to learn the world of business, but he was desperately unhappy. As a result, the quality of his work was shoddy and he repeatedly drew the ire of his master. In 1819 Moses was dismissed. "I went home with mixed feelings, happiness on my account and grief for my poor father," he confessed when he left Boston for Ellsworth.

Because his father "did not keep house" but boarded with friends when he was not logging in the woods, Moses was sent to live and work first for a farmer "cutting and hauling wood, threshing and driving oxen," and later for a blacksmith. Neither job satisfied him. Finally, his father suggested Moses consider a life at sea. Dr. Adams warned his son that a sailor's life would be filled with danger and hard work.

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4. John Dann, ed., *A Diary of the Life of Jacob Nagle, Sailor, from the Year 1775-1841* (New York, 1988); James Fenimore Cooper, *Ned Myers; or a Life Before the Mast* (Philadelphia, 1843). For the story of Cooper's and Meyer's collaboration, see James Fenimore Cooper to Richard Bentley, July 18, 1843, in James F. Beard, ed., *The Letters and Journals of James Fenimore Cooper*, 6 vols. (Cambridge, Massachusetts, 1964), IV, 383n, 391-392, 412, VI, 77n.

5. Albert David, *History of Ellsworth, Maine* (Lewiston, Maine, 1927), pp. 25-29, 76; Llewellyn Deane, "John G. Deane: A Sketch of his Life," *Collections and Proceedings of the Maine Historical Society*, 2nd ser., I, (1980), 179-196, 210-216. Andrew Adams, ed., *A Genealogical History of Henry Adams . . .* (Rutland, Vermont, 1898), pp. 25, 38-39. "Representatives to the Massachusetts General Court from Ellsworth, Maine, Prior to 1820," *Bangor Historical Magazine*, III, (1892), 138.

6. Minutes of the Supreme Judicial Court of Massachusetts, Hancock County (Maine State Library), vol. 4, 89-92; John Bullfinch, *The Trial of Moses Adams* (Boston, 1815). Adams, Common Place Book, I, 5-8, 36.

And Moses' uncle, George Herbert, spent "almost the whole of a long winter night . . . pointing out the dangerous temptations and allurements to vice in all their different forms to which [Moses] would be particularly exposed in the profession [he] was about to embark on. . . ." Despite these gloomy prophecies, Moses was excited. He told his father that he had often thought about going to sea, "not with that hankering desire which boys too often have . . . but as just the business in which my independent spirit would be freely indulged."[7]

To prepare for his new career and to bide his time until a good opportunity aboard a ship could be found, Moses was sent to Framingham Academy in Massachusetts, a school on whose board of trustees his uncle Josiah Adams sat. At the end of the term, Moses' uncle, Captain Weare Park, offered him a berth on the ship *Atlas* then in drydock in Boston. Within two days of his tearful departure from the Academy, Moses was hard at work scraping, caulking and painting the bottom of the *Atlas*. He and another young man "worked like dogs . . . in the heat of the summer at this dirtiest and most disagreeable job." Just before the ship's sailing, he was dismissed because Captain Park quarreled with the ship's owners and a new crew was brought on board. From this experience Moses later drew the lesson that "dependents must expect to be subject to . . . injustice."[8]

Eventually, Moses found a berth on the ill-fated *Rover*. When he returned from his maiden voyage, Adams paid his debts and visited his friends in Framingham before he began looking for a new ship. Finally, in June 1821 Moses signed on the *Palladium*, a whaler owned by Israel Thorndike, a wealthy Salem and Boston merchant. Thorndike chose Captain Alexander Macy, one of a handful of experienced and daring Nantucket whalemen, to challenge Great Britain's hold on the lucrative whaling industry. The *Palladium* was not scheduled to leave Boston until July 1821. However, Moses received an advance on his prospective share of the profits—1/160 part of the oil sold when the *Palladium* returned—which he used to pay his boarding bill and "part of a new debt" he owed.[9]

The *Palladium* left Boston Harbor just before the Fourth of July, 1821, on a course which took her first to the Azores and then to the Cape Verde Islands where Captain Macy took on fresh provisions, livestock, and two additional sailors. As the ship sailed south along the coast of Brazil heading for Cape Horn, Moses and the crew killed their first whale. But this stroke of luck was not a portent of good things to come. Rounding Cape Horn, the *Palladium* was struck by a furious westerly gale that blew the ship off course for 30 days. At length, near the end of November, the *Palladium* put into port at Coquimbo, Chile. While repairs were being made, Moses had his first encounter with a non-American culture. His review was mixed. "This is a fine little city," he wrote,

> but I do not like its inhabitants. They are (as far as I can learn of the lower class of them) a set of bloodthirsty banditti, who are at all times willing for the sake of a few dollars, or for some trifling grievance, to plunge their knives into the breast of any one. Notwithstanding this there are many worthy people among them and at some future day the Chilean Republic may rank as high as that of the United States[10]

With the ship in good order again, Captain Macy set course for Hawaii, arriving on March 19, 1822 in the midst of a heavy thunderstorm. Because he was unable to get fresh provisions at Kealakehua Bay, Macy sailed to Maui and then to Oahu. Moses described the islands as a "perfect garden" and the people as "stout, healthy, well-formed . . . but not remarkably handsome." After taking on water, fruit and vegetables, the crew unloaded a printing press at Honolulu that was to be used by the American missionaries who had come to Hawaii just a year earlier. Despite the missionaries' use of modern techniques to bring Christianity to the Hawaiians, Moses believed the effort was bound to fail, because the missionary "precepts have been more than counteracted by the examples of sailors and others residing there."[11]

7. For Moses' life as an apprentice in Boston from 1816 to 1818, Adams, Common Place Book, I, 24-117, and his remarks about going to sea, I, 125-128.

8. Moses writes about the Framingham Academy in glowing terms, *ibid.*, I, 129-132; II, 1-26. See also, William Barry, *A History of Framingham, Massachusetts* (Boston, 1847), pp. 79-85. Adams, Common Place Book, II, 26-28, 45.

9. Adams, Common Place Book, II, 48. The *Palladium* had been built in Salem in 1817 and a year later sold to Thorndike for $21,150. *Bentley Diary*, IV, 491. Edouard A. Stackpole, *Whales and Destiny: the Rivalry between America, France and Britain for Control of the Southern Whale Fishery, 1785-1825* (Amherst, Massachusetts, 1972), pp. 371-383 for the revival of the New England whaling industry.

10. Adams, Common Place Book, II, 59-68.

11. *Ibid.*, II, 68-69. Edouard A. Stackpole, *The Sea-Hunters: The New England Whalemen During Two Centuries, 1635-1835* (New York, 1953), pp. 306-308.

When the *Palladium* left Honolulu early in April for the uncharted western Pacific whaling area known as the "Coast of Japan," Moses caught sight of the fabled *Cleopatra's Barge*. The lavish ship had been built in 1816 for George Crowinshield in Salem but since 1820 had been in the possession of King Kamehameha. From April to August, the *Palladium* cruised north and west "on Japan" pursuing and killing whales to make up about 600 barrels of sperm oil, only about one-fourth of the ship's capacity. Although Moses expected "to have better success" next season because Captain Macy had "just found out the best places to look for whales," other sailors were so "downhearted" at the *Palladium*'s lack of success that they "attempted to run away" when the ship came within sight of the California coast.[12]

The *Palladium* spent the winter of 1822-1823 cruising along the coast of California and Mexico adding only another 450 barrels of oil. Moses attributed the *Palladium*'s poor luck to the great number of ships "now scouring the Pacific in search of whales" and to the "fact" that the whales "grow shy of Yankee whalesmen." "If England is the Mistress of the ocean," Moses wrote to his friend Sumner Wheeler, "New England certainly is of its inhabitants." Whales "fly from the sight of a Yankee whaleship as from certain death. It is even reported," he added, "that they have learned the names of almost all the whalemen in Nantucket. . . . For a ship commanded by a captain from that place, having a dead man on board, the officers were consulting on the methods of performing the last ceremony to the body, when a whale coming up and hearing the word 'coffin' hastened back again singing out as he went down, 'No, no, Coffin, you don't catch me.' "[13]

In November, the ship put into Santa Barbara for fresh provisions, half of the crew at a time going ashore on liberty. Moses described the town as "a pleasant little Spanish place" that was divided into two distinct parts. Nearest the shore was a small market town in which only the Spanish or "civilized inhabitants" lived. About two miles inland was the "residence of Spanish missionaries and converted Indians, or rather those who have been forced into a state of abject submission," he cynically noted. The *Palladium* remained in Santa Barbara for a month, taking on fresh beef, sheep, pumpkins, beans and water in preparation for a second cruise "on Japan" in the spring of 1823.[14]

"The whales are very wild on this cruising ground. . . . ," wrote Moses when his ship arrived on the "Coast of Japan." He professed not to be afraid—or "not quite so much afraid of whales as some people"—trusting in Providence to protect him and his shipmates. But he readily acknowledged that whaling was "a dangerous sport." Sometimes, he told his schoolmate Frederick Hill, "if the animal is not very wild and the boat header is a good whaleman he can kill him in a few minutes." More often, after the whale "writhes in agony" for a few moments from the wound inflicted by a well-aimed harpoon, he dives or "rushes forward, dragging the boats after him" for hours. Then, "not being able to rid himself of his enemies" the whale "stops, enraged, to fight them." He throws his flukes or tail, sometimes smashing one of the boats.

On one occasion, Moses reported, the boat to which he belonged was cut in half by the flip of a whale's tail. Moses clung to the broken boat, alternately fearing that the whale would return or that he would slip into the water and drown. Before either happened, another boat rescued Moses and those of his mates who were able to hang on. The whaleman in the second boat then buried a lance in the whale's "life, at which his spout is tinged with blood and . . . the water all around crimsoned." Safe on board the *Palladium,* Moses completed his description of his adventure in poetic fashion:

> The dying monster again betakes himself to flight, but overcome with pain and weak with the loss of blood, his speed is gradually diminished, till at last his "fins" fall motionless to his side; his "eyes" are closed; his heavy "jaws" drop open; he rolls upon his side, and yields to man and the all conquering power of death.[15]

As soon as the whale was dead it was brought alongside the ship and tied to it by the flukes. First, the head was cut off and the blubber stripped from the body. These pieces, Moses explained, are then "cut and minced fine and the oil tried out of them" in two large, heated pots. Because the scraps from the first pots of

12. Adams, Common Place Book, II, 83, Daniel L. Ferguson, *Cleopatra's Barge: The Crowinshield Story* (Boston, 1976), pp. 77-118.

13. Adams, Common Place Book, II, 50.

14. *Ibid.*, II, 75-79, 81. Stackpole, *Sea-Hunters*, p. 308.

15. *Ibid.*, II, 71-72, 57-58.

oil were used for fuel "but little wood is burned in making oil." With two days of hard work, 60 barrels of oil were added to the ship's hold. While he worked cutting blubber or tending the boiling pots, Moses often imagined himself at home with friends sitting at the "pleasant warmth of the fireside."[16]

When there were no whales from which to extract oil or to pursue, Moses had a great deal of leisure time. "I live as well or better here than I should in many gentlemen's families in America," he wrote his father after a year at sea. He read, wrote long letters, as well as poetry, he probed the strengths and weaknesses of his character and he daydreamed. In addition to the Bible, in which he read a chapter or two each day, Moses read a score of other books, including several in Latin and French. His letters were often concerned with personal reform. In a letter to his older brother, William, for example, Moses chastised himself for having been "too lazy, stupid and discontented" when he was an apprentice. "You will not find your brother at sea the same Moses Adams . . . that was in Boston," he promised.[17]

Specifically, Moses was proud of how well he had honed his seamen's skills. He boasted to his father that he had "perfected myself in all the branches of seamanship, navigation and lunar observations." And, in a subsequent letter to his brother William, Moses defended his decision to go to sea. If he had remained at Peters and Pond, he argued, he would have spent "years in discontent and unhappiness and at the age of 21 I should have been ruined, without any inclination to be a merchant and capital to set me up as such." Now, he had "a trade that can always support me, . . . was well contented . . . and had shipmates [who] are tolerably agreeable companions." Moses concluded his optimistic assessment by adding, "I hope sometime or other to be something more than a common Jack."[18]

From April to December 1823, the *Palladium* cruised the western Pacific again, this time with more luck. Steadily, the hold filled with oil. Captain Macy, meanwhile, charted the Pacific waters into which his chase for whales took him. On Christmas Day, 1823, for example, he discovered and named three islands (one for himself) near the Fiji Islands. Then, the *Palladium* sailed east to California, to the same cruising grounds she had crisscrossed the previous winter. By the spring of 1824, the *Palladium* finally had achieved its capacity of 2,250 barrels of oil and she ran south to Coquimbo for refitting. From there, the *Palladium* headed home, arriving in Boston on October 18, 1824, less than a month before Moses' twenty-first birthday.[19]

After more than three years at sea Moses was eager to see his friends and family. But for two days after he arrived in Boston he was paralyzed with anxiety. Moses was so fearful that he would learn of some new family tragedy that he "did not go near [his] brother." Finally, Moses trimmed his beard, bought a new suit and set out on a round of visits to his friends, beginning with Daniel Badger and Sumner Wheeler. Moses took the latter on a tour of the *Palladium*. Only then did Moses visit his older brother William, who had established a school in the South End, and his youngest brother Charles, who was clerking in a store on Court Street. From his brothers, Moses was pleased to learn that his father had married a young woman in the winter of 1821.[20]

By this time the *Palladium*'s cargo of sperm oil had been unloaded and sold. Moses had hoped that his share of the profits from the sale would be about $450, but he made only just over $100 for his 39 months of work. Still, he chose to board "up in town" at Ebenezer Nickerson's on Devonshire Street rather than at one of the cheaper boarding houses along Broad Street, especially for mariners.[21]

While he looked for a berth on another ship, Moses reflected on his situation. He was, as he put it, a sailor "by necessity, not by choice." Of course, Moses' comment was freighted consciously with his unique personal history. But he knew, too, that the economic result for him was the same as that for his lower-class

16. *Ibid.*, II, 72-73.
17. *Ibid.*, II, 55-56, 102, 77-79.
18. *Ibid.*, II, 63, 78.

19. *Ibid.*, II, 74-75, 86. Stackpole, *Sea-Hunters*, p. 276. There were clusters of Boston businessmen in Valparaiso, Chile and Lima, Peru when the *Palladium* put into those ports in 1824. Linda M. Maloney, *The Captain from Connecticut: The Life and Naval Times of Isaac Hull* (Boston, 1986), pp. 354-355.

20. Adams, Common Place Book, II, 86-87, 114-116, 123. Dr. Adams married Nancy Phillips on December 12, 1821. Richard Henry Dana reported the same sense of anxiety when he returned from his voyage in 1836, *Two Years Before the Mast* (Boston, 1840), pp. 354-355.

21. Adams, Common Place Book, II, 87-88. Stimpson, *Boston Directory* (1820), p. 157.

shipmates who were driven to become sailors simply because they needed a job. Like other young men who sailed before the mast, Moses was poor and often in debt. To be sure, when Moses' hard work and dedication to learning seamanship won him a promotion to mate in October 1825 and to captain several years later, his wages rose accordingly. Still, mates earned only a bit more than seamen, and by an unwritten rule, captains often were paid no more than twice as much as an ordinary seaman. Even after he was promoted to mate, Moses still owned no taxable property and he lived on credit in a South End boarding house.[22]

After only a month ashore, Moses' financial pinch led him to apply to Israel Thorndike for a berth on the brig *Palmer*, bound for Brazil. Late in November 1824, the *Palmer* set sail for Pernambuco. Moses was delighted. He quickly concluded that the crew of the *Palmer* arrived in Brazil while a civil war was in progress. Among other problems, this meant that Captain whom he had sailed. Still, this voyage was no more profitable for Moses than his earlier cruises. The *Palmer* arrived in Brazil while a civil war was in progress. Among other problems, this meant that Captain Moore was unable to buy a cargo of sugar as planned because much of the crop had been destroyed in the fields. Therefore, in March, the *Palmer* sailed south to Rio de Janeiro, which Moses described as large "both in extent and in population, but . . . not very elegant." Besides, added Moses in a letter to his brother William, many of the city's splendid public buildings had been converted into barracks for the soldiers of Emperor Pedro I, the Portuguese king who had declared Brazil independent in 1822, and who was now locked in a struggle with local republicans.[23]

The civil war made normal business impossible, and Moses and his shipmates had little work. To combat the crew's idleness, the captain sent men ashore to cut wood and "bring it on board without paying for it." On one such excursion, a work party "met with a flock of turkeys," as Moses put it, and brought the birds back to the ship. This theft had two results: first, the crew had a "fine dinner of roast turkey"; and second, the captain, fearful of "detection in the affair of the turkeys" no longer sent the men ashore for wood. Although Moses' conscience was troubled because he ate so "heartily," he easily rationalized his small part in the theft when he learned that the "robbery saves us from a tedious pull of 20 miles per day."[24]

After weeks of waiting, Captain Moore still was unable to get a cargo of sugar or coffee that could be carried to Denmark or Russia. With this latest disappointment, a rumor circulated in the forecastle that the *Palmer* would sail to Buenos Aires for a cargo of jerked, or dried, beef to be carried to Havana, Cuba. Moses was fearful of that possibility. He had not been inoculated against "that fatal contagion—the small pox," and he knew that arriving in Cuba in the summer, before the "sickly season" was over, would be extremely dangerous. Finally, to Moses' great relief, Captain Moore received orders to return to Boston. Carrying only a few hides, the *Palmer* tied up at Russia Wharf late in July.[25]

When Moses stepped ashore from the *Palmer* in the summer of 1825, it marked 10 years since he began to call Boston home. The town of 34,000 to which he had come at 13 had become a city of more than 58,000. During the next several months, Moses noted how the growing city had changed and he also entered into a new phase in his personal life. His brother William had kept Moses informed about politics; he knew that President John Quincy Adams had initiated America's policy of neutrality toward Brazil, from which the *Palmer*'s owner hoped to benefit. William also told him about the recent deaths of those "venerable" patriots, governors William Eustis and John Brooks. And, as the *Palmer* maneuvered along the Boston shoreline, Moses could see both the destruction caused by a huge fire near Central Wharf and the new docks and market being built as an urban renewal project begun by Mayor Josiah Quincy.[26]

As usual after a long voyage, Moses wanted to see his friends. He visited former schoolmates Sumner Wheeler, who was a student at Harvard College, and Joseph Brigham, who was clerking in a store in Cambridgeport. Moses chose not to see Frederick Hill,

22. Smith, "The Material Lives of Laboring Philadelphians, 1750-1800," *Willian and Mary Quarterly* (1981), pp. 190-192; James Green, *Boston's Workers* (Boston, 1919), pp. 22-28; Samuel E. Morison, *The Maritime History of Massachusetts, 1783-1860* (Boston, 1921), p. 106, Ira Dye, "Early American Merchant Seamen," American Philosophical Society, *Proceedings* (1976), pp. 235-240.

23. Adams, Common Place Book, II, 94; although Moses praised his fellow crewmen as "in *every respect* the best set of men that I ever saw in a vessel's forecastle," a row occurred which ended with several men being sent home on another ship.

24. *Ibid.*, II, 118.

25. *Ibid.*, II, 112, 117, 122.

26. *Ibid.*, II, 122, 123, 134.

who had published essays, poems and plays, edited a newspaper and worked as a professional actor since leaving the Academy. Although the two young men had exchanged letters and literary compositions, Moses concluded self-consciously that the "different paths" he and Hill had "pursued in life, the different society we have associated with" made friendship impossible between a sailor and an author and actor.[27]

Whatever pain Moses may have felt about ending his friendship with Hill seems to have faded quickly, for in the summer of 1825 Moses fell in love. At his friend Daniel Badger's home one evening Moses met Miss Elizabeth Bowman whose "every look and action" reminded him of his mother. Within a month, he and Betsy had "entered into a solemn engagement to unite our destinies for life as soon as circumstances would admit . . . ," but their poverty kept them from marriage. "For my part," wrote Moses, "I had not property enough to buy a wedding suit . . . and she was in no better circumstances." They contented themselves with making plans and dreaming of prosperity.[28]

In order to remain ashore as much as possible, Moses had taken a job working on the *Palmer*, outfitting her for a voyage to Indonesia where the pepper trade had been opened to Americans. Thorndike, the ship's owner, earlier had promised Adams a promotion to 2nd mate, but a delay in the *Palmer*'s sailing forced Moses to look for another berth. He did not have enough money to pay his boarding bill.[29]

Luckily, a fellow boarder recommended Moses to Captain James Smith of the schooner *Morning Star*, who needed a mate. After taking an "affectionate leave" from Elizabeth, Moses sailed from Boston on October 8, 1825, bound for Brazil. Adams worked hard to put the schooner in good order and to impress Captain Smith. Moses believed he "succeeded very well." In fact, when the *Morning Star* returned to Boston in January the schooner's owners asked Moses to make a new set of sails for her. He agreed. The job gave him steady employment, the privilege of sleeping on board (which cut his living expenses) and, most importantly, time to be with Elizabeth. But within a short time his "hopeless poverty" forced him to go back to sea. When he complained, Betsy lovingly counseled, "Be patient and hope for better times."[30]

In March 1826, Moses sailed again as mate of the *Morning Star*, this time bound for Marseilles. The trip was stormy and the schooner was "under water a great deal of the time." Moses bought gifts in France for Elizabeth before leaving for Brazil. However, on his return to Boston in October 1826, Moses sadly learned that his "most intimate and dearest friend" Elizabeth was dead.

There, in the fall of 1826, the journal of Moses Adams ends. Although his voice is lost, we know, from the notes he appended in 1834 and 1835 to other journal entries and from other fragments, that in the decade after 1826 he married Frances Bradley of Boston, became a father (the child died shortly after birth) and became captain of the brig *Ellsworth*, at least from 1834 to 1837.[31]

When Moses sailed around Cape Horn in 1821 he composed a few paragraphs about his experiences which he intended as a general metaphor for the various ways men coped with life in a dangerous, unstable world. Men in the world are like sailors on board a ship buffeted by a storm of troubles. During a crisis some think only of themselves, others react in a good and godly way, but no one is able to completely control their own destiny.

In his metaphor, a ship is hit by a furious storm, "the sail is blown to rags, and the masts are carried away." Some sailors "have already found a watery grave," and the survivors despair of living. Only then do they think of home and their loved ones, but before they are able to have a single loving thought, a huge wave sweeps them into the "world of the spirits." The few men who are left clinging to the broken ship "see death coming in every rolling sea and flash of lightning." Almost too late, they "think of the God of Mercy—they remember him who alone can help; they pray for assistance and their prayers are not in vain." They are saved by Providence. "Thus we pass through life," Moses concluded, "acting the several parts assigned by fate, till the curtain of death is dropped and we leave the stage forever."[32]

For Moses Adams, metaphor was life. A family tragedy forced him to struggle through life alone. At

27. *Ibid.*, II, 133-134, 136; for a sketch of Hill, see Weldon Durham, *American Theatre Companies, 1749-1887* (Westport, Conn., 1986), pp. 366-367.

28. Adams, Common Place Book, II, 103, 138-142.

29. *Ibid.*, II, 136, 142.

30. *Ibid.*, II, 142-144.

31. *Ibid.*, Adams, *Genealogical History*, pp. 25, 38.

32. Adams, Common Place Book, II, 59.

During the morning of 18 May the merchant ship *Essex Lance* broke down and dropped astern of the convoy. Gretton assigned HM Trawler *Northern Spray* to escort the disabled merchant ship independently to port and the two ships did not rejoin SC 130. As SC 130 proceeded away from North America at a speed of about eight knots it received air cover from aircraft of the Royal Canadian Air Force.[8] Canadian aircraft provided air cover to SC 130 up to a point some six hundred miles east of Newfoundland, but Gretton did not consider the air support "as satisfactory as it might have been" owing to a lack of training of the aircrews and a failure of coordination between the air force and navy authorities in Newfoundland.[9]

The Germans quickly discovered the location and course of SC 130. Unknown to the Allies, the Germans were decrypting Allied command radio transmissions. Sometimes it only took the Germans a few hours to decrypt an Allied radio transmission, and at other times a day or two.[10] In the case of SC 130, the Germans, on 16 May, decrypted an Admiralty U-boat Situation Report addressed to convoy commodores dated 14 May, which gave SC 130's speed as 7.5 knots and course as 076 degrees with position of one hundred and fifty miles southeast of Cape Race, Newfoundland.[11] On the basis of this information the *Befehlshaber der U-boot* [BdU] came to the conclusion that SC 130 was proceeding to the United Kingdom by a southerly route and ordered some twenty U-boats,[12] who were forming a patrol line southeast of Cape Farewell, Greenland, to intercept the convoy. On 18 May the German U-boats located SC 130 at approximately 54° N 36° W.[13]

The Allies, unknown to the Germans, were reading the command radio transmissions of the BdU.[14] And like the German cryptographic effort there were at times delays or lags—sometimes as much as several days—between the time when the Allies intercepted a German radio transmission and when it was rendered into plain text by the cryptographers. For example, at the beginning of the Battle for SC 130 it took Allied code breakers over twenty-one hours to decrypt one short German radio transmission.[15] However, Gretton did not know at the time about the Allies reading German coded radio transmissions. The first warning that the commander of SC 130's escort had of the approach of German U-boats was from HF/DF. At 2019 on 18 May the rescue ship *Zamalek* picked up a "ground ray signal" bearing north on her HF/DF set and Gretton sent HMS *Vidette* to run down this bearing for twenty miles in an unsuccessful attempt, to locate the U-boat making the radio transmission.[16] There is some confusion as to exactly when the Allies discovered that the Germans were going to attack SC 130. After the battle, Gretton stated that he was "puzzled" by running into a concentration of U-boats without first being warned by the Admiralty, which should have itself had forewarning from shore-based HF/DF fixes. He also thought that it was possible that the convoy "had run, by misadventure, into a concentration" of U-boats and that the Germans might be using radio frequencies, not detected by his force or by "British Shore Organizations."[17] But the Allies must have had some prior knowledge of the German threat to SC 130 for the 1st Support Group, consisting of the frigates HMS *Jed*, HMS *Wear*, HMS *Spey*, and the ex US Coast Guard cutter HMS *Sennen* (equipped with HF/DF) sailed from St. John's, Newfoundland during the afternoon of 16 May to reinforce the convoy's escort.[18]

At 2316 the escorts of SC 130 picked the first of many H/F[19] signals on their HF/DF sets and it was "quickly appreciated" by Gretton that there were two U-boats close ahead of the convoy and one on each quarter of it.[19A] But because there was a full moon, a

8. PRO, ADM 199/1336, f. 10.

9. PRO, ADM 199/203, Remarks on Aircraft Co-operation.

10. Ministry of Defence (Naval), *The German U-Boat War in the Atlantic, 1939-1945* (London, 1989), vol. II, pp. 88-89.

11. Ottawa, National Defense Headquarters, D. Hist., BdU War Diary, 17 May 1943. Hereafter this office will be cited as D. Hist.

12. U-640, U-657, U-760, U-636, U-340, U-731, U-304, U-227, U-645, U-952, U-418, U-258, U-381, U-954, U-92, U-109, U-202, U-664, U-666, U-558, U-752, U-336, U-642, U-603, U-228, D. Hist., BdU War Diary, 17 May 1943.

13. *The U-Boat War*, vol. II, p. 110.

14. F. H. Hinsley et al., *British Intelligence in the Second World War* (London, 1981), vol. II, pp. 547-572. Perhaps the best short account of the effects of code breaking on the Battle of the Atlantic is Jurgen Rohwer, "The Operational Use of 'Ultra' in the Battle of the Atlantic," *Intelligence and International Relations, 1900-1945*, eds. Christopher Andrew and Jeremy Noakes (Exeter, 1987), pp. 275-292.

15. PRO, DEFE 3/718, intercepted 0018/19/5/43, decrypted 2135/19/5/43.

16. PRO, ADM 199/1336, f. 10; ADM 237/203, HMS *Vidette*, Report of Proceedings during passage of Convoy SC 130.

17. PRO, ADM 237/202, Remarks by Commodore (D), Western Approaches, Convoy SC 130.

18. PRO, ADM 199/1336, f. 46.

19. High frequency.

19A. PRO, ADM 199/1336, f. 10.

light sea running, with a slight breeze out of the northwest, which were considered by the BdU to be "especially unfavorable" conditions for U-boat operations, the convoy was not at this time attacked.[20] The rescue ship *Zamalek* and HMS *Duncan* both at 0134 on 19 May at 54° 445" N 35° 36" W obtained a good HF/DF fix which placed a U-boat four miles ahead on the port bow of the convoy. HMS *Duncan* increased speed and steered to intercept the U-boat. At a range of five thousand yards a radar contact was obtained, but at a range of four thousand yards the U-boat dived, and the contact was lost. HMS *Duncan* dropped five depth charges on the estimated position of the U-boat, and without regaining contact, continued to hunt the U-boat until the convoy was passed, and was out of danger. Gretton then informed the Admiralty that "convoy shadowed by at least 4 submarines . . . Duncan has attacked one."[21] Even before HMS *Duncan* had conducted the first attack of the battle, U-boats began reporting to the BdU the course, position, and speed of SC 130. For example, at 0040 the U-304 radioed "CONVOY IN SQUARE 4675. EASTERLY COURSE SPEED 7 KNOTS."[22] At 0300, just before dawn, with the objective of "foxing the intended dawn submerged attacker" Gretton ordered the convoy to make two emergency turns to starboard and the convoy returned to the base course of 081 degrees at 0400.[23]

At 0340 just after dawn the first VLR B-24 Liberator[24] aircraft of Royal Air Force [RAF] 120 Squadron from Reykjavik, Iceland appeared over the convoy, and sighted a U-boat in what Gretton thought "would have been the ideal firing position" if the convoy had not made a change of course.[25] Liberator T/120 attacked the U-boat with three 250 lb. depth charges which straddled the vessel. Just after the U-boat submerged aircraft T/120 attacked again with two mark 24 mines—acoustic homing torpedoes—which were dropped into the U-boat's wake. There were two small explosions seventy yards from where the torpedoes entered the water sinking the U-954 without a trace.[26] Just before the U-954 was sunk it sent the following radio message: "CONVOY IN NAVAL GRID SQUARE AK 5482, HAVE SIGHTED AN AIRCRAFT."[27] At 0415 aircraft T/120 sighted two 700-ton U-boats off the port quarter of the convoy. The aircraft dived on the two U-boats making a mock attack having expended all its depth charges and acoustic homing torpedoes during the attack on the U-954. Both U-boats dived and a marker was dropped. The aircraft then informed Gretton of the position of the two U-boats and HMS *Tay* was sent to investigate. The British frigate sighted a U-boat and forced her to submerge. HMS *Tay* carried out, without result, an attack on the U-boat and then remained in the area for several hours to keep the U-boat down until the convoy safely passed.[28]

At 0524 aircraft T/120 sighted another U-boat on which another mock attack was carried out. This U-boat did not dive, but rather opened fire on the British aircraft with antiaircraft guns. The aircraft then banked to port and its rear gunner raked the conning tower of the U-boat with machine gun fire forcing the U-boat to "crash dive." A marker was dropped on the spot where the U-boat had dived and Gretton was informed of the action.[29] HMS *Vidette* was dispatched to the area where the U-boat had been forced to dive but no contact was gained.[30] Aircraft T/120 next sighted a U-boat submerging fourteen miles ahead of SC 130. The aircraft dropped a marker on the position where the U-boat had dived and HMS *Pink* was ordered to investigate. The British corvette dropped some depth charges and then rejoined the convoy. At 0624 Gretton ordered that the convoy make an emergency turn to starboard to avoid the U-boat forced down by aircraft T/120. The convoy returned to the base course of 081 degrees at 0726.[31]

20. D. Hist., BdU War Diary, 18 May 1943.

21. PRO, ADM 199/1336, f. 10.

22. PRO, DEFE 3/718, 0004/19/5/43; See also PRO, DEFE, 3/718, 0018/19/5/43; 0149/19/5/43.

23. PRO, ADM 199/1336, f. 11; ADM 237/203, SC 130, Log of Shadowing and Attacks.

24. A VLR B-24 Liberator is a four engine aircraft which has been modified to increase its range to 2,600 nautical miles carrying 1,500 lbs. of depth charges and acoustic homing torpedoes. PRO, AIR 20/1065, Minutes by VCAS, 18 May 1943; Appendix I and II, to C-in-C Coastal Command 31 May 1943. The document gives specific details of the modifications.

25. PRO, ADM 199/1336, f. 11.

26. PRO, AIR 27/911, 19 May 1943; Alfred Price, *Aircraft versus Submarine* (Annapolis, Md., 1973), pp. 136-137.

27. PRO, DEFE 3/718, 0917/19/5/43.

28. PRO, ADM 199/1336, f. 11; AIR 27/911, 19 May 1943.

29. PRO, AIR 27/911 19 May 1943.

30. PRO, ADM 237/203, HMS *Vidette*, Report of Proceedings during passage of Convoy SC 130.

31. PRO, ADM 199/1336, f. 11, ADM 237/203, Log of Shadowing and Attacks; AIR 27/911, 19 May 1943.

A fourth VLR B-24 Liberator O/120 arrived over the convoy just before it returned to its base course. At the request of Gretton aircraft O/120 conducted a *frog* search, which is a sweep across the stern of the convoy. During the course of this search a U-boat was sighted, forced to dive, and was attacked with an acoustic homing torpedo. Then several other searches, at the request of Gretton, were conducted during the course of which another U-boat was sighted, forced to dive, and was attacked with an acoustic homing torpedo. Aircraft O/120 circled over the position where the U-boat submerged until HMS *Tay* arrived to continue the hunt which was without result.[56] When aircraft O/120 left the convoy for its base in Iceland it was replaced by another VLR B-24 Liberator H/120. This aircraft also conducted a number of patrols around SC 130 including an *adder,* which is a search within visual distance around all four sides of the convoy. Aircraft H/120 did not sight any U-boats before returning to base.[57]

VLR B-24 Liberators patrolling around SC 130 during the daylight hours of 19 May greatly assisted the surface escorts of the convoy in defeating and breaking up U-boat attacks. The effects of air attacks and the successful tactics employed by surface escorts are reflected in the radio transmissions made by the U-boats attacking SC 130. The U-645 radioed "UP TO NOW HAVE BEEN DRIVEN UNDER WATER CONTINUALLY BY AIRCRAFT OUT OF LOW CLOUDS AND BY DESTROYERS." The same U-boat later radioed "LOCATED BY AIRCRAFT." While the U-707 was "CONTINUOUSLY DRIVEN UNDERWATER," the U-304 was attacked by "DEPTH CHARGES. NEGATIVE BUOYANCE TANKS DEFECTIVE . . . LOST CONTACT." And another U-boat radioed "CORVETTES DEPTH CHARGES . . . PORT FORWARD ELECTRICAL MACHINERY BEARING DEFECTIVE AM REPAIRING."[58] By the evening of 19 May, the BdU had concluded "THAT IT WAS NOT POSSIBLE TO STAY ON CONVOY ON ACCOUNT OF AIR." And the U-boats that were attacking SC 130 were ordered "TO MOVE OFF AND PROCEED AHEAD AROUND THE CONVOY AT BEST SPEED OUTSIDE CLOSE AIR. I.E. PRESUMABLY AT A DISTANCE OF 30 OR 40 MILES, IN ORDER TO DIVE AHEAD OF THE CONVOY FOR DAY ATTACK."[59] Later that evening the U-boats were ordered to steam to a position to intercept SC 130 at night in order to avoid air attacks but at the same time "PROCEED WITH M/G READY FOR FIRING AND MANNED IN CASE OF SURPRISE ATTACKS."[60] SC 130 was not attacked during the night of 19 May and not even a radar contact on a U-boat was obtained. Early in the voyage HMS *Sunflower*'s sonar recorder broke down and during the evening of 19 May her radar also failed and could not be repaired.[61] Also during the night of 19 May HMCS *Kitchener* was detached to reinforce the escort of Convoy ON 184.[62] At 0054 and 0107 HMS *Jed* and HMS *Spey* were ordered to search down HF/DF bearings. Two U-boats were found on the surface, forced to dive, and were attacked.[63] At dawn SC 130 conducted two emergency turns to port and seventy-one minutes later the convoy returned to its base course. "The ruse was again successful . . . no attacks were attempted."[64]

Shortly after dawn the first VLR B-24 Liberator N/120 appeared over SC 130 and at the request of Gretton conducted an *adder* search during which a U-boat was sighted and attacked. The enemy vessel dived and aircraft N/120 dropped three 250 lb. depth charges in the swirl of the submerging U-boat. Five minutes later the bow of the U-boat was seen from the aircraft protruding from the sea at a 30 degree angle. An acoustic homing torpedo was then dropped near the damaged U-boat which was most likely sunk as a result of this attack.[65] One hour and forty minutes later another U-boat was sighted. As aircraft N/120 dived on this U-boat it opened fire with antiaircraft guns. Aircraft N/120 took evasive action and her rear gunner fired on the enemy vessel. While this U-boat was being attack-

56. PRO, ADM 199/1336, f. 12; AIR 27/911, 19 May 1943.
57. PRO, AIR 27/911, 19 May 1943.
58. PRO, DEFE 3/718, 1637, 1949, 2018/19/5; 0233/20/5/43.
59. PRO, DEFE 3/817, 1743/19/5/43.
60. PRO, DEFE 3/718, 2300/19/5/43.
61. PRO, ADM 237/203, HMS *Sunflower,* Narrative from 14 May with SC 130.
62. PRO, ADM 237/203, SIGNALS IN, 1037Z/19/5/43; ADM 199/1336, F. 12.
63. PRO, ADM 237/203, SIGNALS CONTINUED.
64. PRO, ADM 199/1336, f. 12.
65. This U-boat was most likely the U-258 which was lost to air attack by an aircraft of RAF 120 Squadron in the vicinity of SC 130. Roskill, *War at Sea,* vol. II, p. 471.

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ed a third U-boat was seen by aircraft N/120. The aircraft circled out of range of the vessel's antiaircraft guns and then informed Gretton that a U-boat was circling on the surface. But this U-boat then crash-dived. While carrying out a *mamba* aircraft N/120 sighted a fourth U-boat whose conning tower was raked with machine gun fire before she "dived rather slowly." Before aircraft N/120 left SC 130 a fifth U-boat was sighted and forced to dive.[66] In the four hours and twenty-six minutes spent over SC 130 aircraft N/120 attacked and probably sunk one U-boat and forced four others to submerge.

At 1315 Gretton ordered another emergency turn to port to avoid a U-boat which had been picked up close ahead of the convoy by HF/DF. After a half hour SC 130 returned to its base course. While the convoy was making the emergency turn HMS *Sennen*, astern of SC 130, obtained a sonar contact and attacked without result.[67]

During the afternoon of 20 May another VLR B-24 Liberator P/120 appeared over SC 130 and Gretton requested a *mamba* search. A U-boat was sighted which submerged in twenty-three seconds before it could be attacked. Two hours later a second U-boat was sighted by aircraft P/120. The aircraft attacked with four 250 lb. depth charges obtaining a straddle around the partly submerged U-boat. The aircraft continued the patrol and sighted a third U-boat. Aircraft P/120 dived, firing machine guns at this U-boat, which returned the fire with antiaircraft guns. The British aircraft attacked a second time firing 180 rounds of cannon fire into the base of the U-boat's conning tower and foredeck. A third attack was made with an acoustic homing torpedo. The U-boat, after this attack, "seemed in difficulties" being down at the stern.[68] The pilot of the aircraft contacted Gretton, and the commander of the escort began to steam towards the damaged U-boat, taking bearings on homing signals transmitted by aircraft P/120. But the operation was cancelled when the U-boat dived, and it was realized that she was over twenty miles from SC 130.[69] While returning to Iceland aircraft P/120 sighted a fourth U-boat which dived and was "lost in sun and haze." All in all, aircraft P/120 had sighted four U-boats, attacked one with depth charges and another with gunfire and an acoustic homing torpedo.[70]

The U-boats during 20 May did not achieve anything and in fact were heavily handled by air and surface escorts. The U-952 radioed "HEAVY DEPTH CHARGING BY 2 DESTROYERS. TUBS 2, 3, 5, AUXILIARY BILGE PUMP DEFECTIVE. SEVERAL LEAKS IN CONTROL ROOM."[71] Another U-boat reported "HEAVY DEPTH CHARGES FROM BOEING [aircraft]. DEFECTS RECTIFIED EXCEPT FOR ATTACK PERISCOPE."[72] The U-413 was "HEAVILY DEPTH CHARGED FOR 90 MINUTES."[73] And a fourth U-boat radioed that she had "BEEN CONSTANTLY DIVING FROM AIRCRAFT."[74] Sunset marked the end of the Battle for SC 130.

SC 130 was not attacked during the night of 20 May. Several escorts made attacks on sonar contacts during the night with no results and HF/DF did not pick up any enemy transmissions after 0100 on 21 May. At dawn on 21 May the convoy made the "usual 90 degree turn . . . in case there were some U-boats still ahead who did not talk on H/F; but no further attempts were made to molest the convoy."[75] Unknown to the escort of SC 130, the Germans had called off the battle, and the BdU had radioed the U-boats attacking the convoy "BREAK OFF OPERATIONS AGAINST CONVOY. MOVE AWAY WESTWARD."[76] And SC 130 arrived with 37 merchant ships in the United Kingdom on 25 May without further incident.

The Germans were utterly defeated in the Battle for SC 130. The U-boats did not sink one Allied merchant ship while four U-boats were lost to Allied air and surface escorts. A further two U-boats were lost to Allied aircraft in operations related to the battle for SC 130. The U-646 and U-273 were sunk on 17 and 19 May by aircraft of RAF 269 Squadron while they were steaming to intercept SC 130.[77] Even if the Allies had sunk no U-boats they would have still won the Battle for SC

66. PRO, AIR 27/911, 20 May 1943.
67. PRO, ADM 199/1336, f. 12.
68. PRO, AIR 27/911, 20 May 1943.
69. PRO, ADM 199/1336, f. 12.
70. PRO, AIR 27/911, 20 May 1943.
71. PRO, DEFE, 3/718, 0337/20/5/43.
72. PRO, DEFE, 3/718, 0930/20/5/43.
73. PRO, DEFE, 3/718, 1945/20/5/43.
74. PRO, DEFE, 3/718, 2314/20/5/43.
75. PRO, ADM 199/1336, f. 13.
76. PRO, DEFE 3/718, 1942/20/5/43.
77. Price, *Aircraft versus Submarine*, p. 136.

130, for their main objective was the safe and timely arrival of merchant ships at their destination and not the destruction of U-boats. Sinking U-boats was desirable, but decidedly a secondary objective compared with the protection of merchant ships. The German objective in the Battle of the Atlantic was to prevent the Allies from sailing merchant ships across that ocean, which, in the case of the battle for SC 130, they absolutely failed to do. The Allied objective, on the other hand, was to sail merchant shipping without loss from enemy action. By this criteria the Allies were the clear victors in the Battle for SC 130.

The Allies won the Battle for SC 130 because they simply out-fought the Germans. The U-boats, in their attacks on SC 130, at every turn were confronted with weapon systems, intelligence breakthroughs, and tactics which they just could not counter. The Germans did not know that the Allies were reading their command radio transmissions. For example, they thought that the Allies were locating U-boat concentrations by means of airborne radar.[78] The Germans also did not know of the use by the Allies of airborne acoustic homing torpedoes against submerging U-boats. Nor did they know of the existence and of the importance of HF/DF. It was HF/DF which enabled Gretton to locate a U-boat before the convoy came within torpedo range and avoid the enemy vessel by making an emergency turn. At the end of his report of the proceedings of SC 130 Gretton stated that "the convoy was by then executing blue turns with the precision of a battlefleet—twenty turns being carried out in all during the passage."[79] HF/DF also gave Gretton the ability to send a warship or an aircraft down the bearing of a U-boat radio transmission and either attack or force the U-boat to submerge causing it to lose contact with the convoy. The importance of HF/DF can be seen by the fact that HMS *Duncan* and HMS *Tay* obtained during the battle a total of 104 bearings on U-boat radio transmissions in the vicinity of SC 130.[80] The surface escort of SC 130 was exceptionally strong; consisting, on the afternoon of 19 May, of two destroyers, five corvettes, four frigates, and one ex-U.S. Coast Guard cutter. These ships acted as a team, were well trained and were skillfully commanded throughout the battle. Also there was effective cooperation between air and surface escorts.[81] The VLR B-24 Liberators of RAF 120 Squadron were the weapon system which tipped the battle in favor of the Allies. It took the Allies a long time to get air support for convoys into the North Atlantic south of Greenland,[82] but when VLR B-24 Liberators began operating in conjunction with the surface escorts of convoys they proved to be decisive. What made aircraft such an effective weapon against U-boats was the high speed of an aircraft relative to a surface vessel, permitting it to search a much greater area than a ship. And with HF/DF Gretton "was able to get fixes on U-boats transmitting near us with great accuracy and to send aircraft quickly after them."[83] On 19 May, SC 130 was supported by five VLR B-24 Liberators. These five aircraft sunk one U-boat, attacked six others, and forced fourteen U-boats to submerge. And on 20 May, two aircraft sunk one U-boat, attacked three others, and forced eight to dive.[84] At the end of the battle the German high command noted the effectiveness of air support for Convoy SC 130 when the BdU noted in its war diary

> that the boats could not approach near owing to continuous air cover being too strong, and it was also not posible to maintain contact and proceed in the vicinity of the convoy owing to the continual surprise attacks from low-lying clouds. These attacks could only be attributed to a very good radar location device which enables the aircraft to detect the boat above the clouds even, and then to make a surprise attack from the clouds. The amazing thing is that apparently at the time only 1 to 2 machines in all were escorting the convoy, according to intercepted messages of aircraft operating. Each machine detected, however, during the whole day one boat more frequently than every quarter-hour, from which it must be concluded that the enemy's radar hardly missed a boat. With about 20 boats in the vicinity of the convoy this was quite possible, since the boats were scattered around the convoy at quite short distances apart for an aircraft.[85]

78. *The U-Boat War*, vol. II, p. 88.

79. PRO, ADM 199/1336, f. 12.

80. There is no information available about the HF/DF operations of the *Zamalek* and HMS *Sennen* during the battle. PRO, ADM 237/203, Report of U-boat transmissions received by HMS *Tay* . . . between 14th May and 23rd May 1943; The Following U-boat transmissions were received by HMS *Duncan*.

81. D. Hist., BdU War Diary, 20 May 1943.

82. David Syrett and W. A. B. Douglas, "Die Wende in der Shlacht in Atlanik; Die Schliebung des Gronland-Luftlochs, 1942-1943," *Marine-Rundschau* (Jan.-Feb., March-April, May-June, 1986). vol. 83, pp. 2-11, 70-73, 147-149.

83. Gretton, *Convoy Escort Commander*, p. 157.

84. PRO, AIR 17/911, 19, 20 May 1943.

85. D. Hist., BdU War Diary, 20 May 1943.

The defeat of the U-boats in the Battle for SC 130 was a strategic as well as a tactical one. SC 130 "was the last convoy to be seriously threaten[ed]"[86] by wolf packs in the North Atlantic. And this defeat played a major role in the German decision on 24 May 1943 to suspend wolf pack operations against convoys in the North Atlantic and to withdraw the U-boats from that region until new weapons and tactics could be developed.[87]

86. D. Hist., BdU War Diary, 24 May 1943.
87. D. Hist., BdU War Diary, 20 May 1943.

David Syrett received his doctorate from the University of London and is presently a professor of history at Queens College, CUNY. His articles have appeared in The American Neptune, Naval War College Review, The Mariners' Mirror, Armed Forces and Society, *and others.*

Book Reviews

DONALD G. SHOMETTE AND ROBERT D. HASLACH, *Raid on America: The Dutch Naval Campaign of 1672-1674*. Studies in Maritime History, William N. Still, Jr., Series Editor. (Columbia, S.C., University of South Carolina Press, 1988). ix-xiii, 386 pages, illustrations. $32.95.

Raid on America is one of a new series of American maritime history studies under publication at the University of South Carolina Press. The present volume is the first of the series to deal with maritime and naval events of pre-revolutionary America. The fifty-year period of Dutch rule in New Netherlands (1614-1664), a brief colonial rule by any standard, was not without its accomplishments before the British seized the colony in 1664. The Netherlands later had an opportunity to regain control of New Netherlands.

This opportunity arose during 1673-1674 as the result of a remarkable naval expedition led by Cornelis Evertsen the Youngest during the Third Anglo-Dutch War. The expedition had its origin in a plan conceived by the rulers of Zeeland province in the Netherlands. According to this plan, a squadron would sortie with the secret mission of seizing St. Helena as a base from which to attack ships of the English East India Company as they returned from India around the Cape of Good Hope. The purpose of the expedition was to obtain as much profit with the least cost to Zeeland at England's expense. As a secondary, alternative mission, the Zeeland squadron was to do as much damage as possible to the colonies of England and France in the New World, commencing with the Guianas in northern South America and extending through the Caribbean to New York and Newfoundland.

Evertsen sailed on December 5, 1672. Coincidentally, a British squadron commanded by Captain Richard Munden departed at almost the same time to intercept a Dutch East India Company fleet off St. Helena. The two squadrons converged at the island of Sao Tiago in the Cape Verde Islands. After a sharp, inconclusive engagement in the Cape Verde Islands, Commodore Evertsen elected to pursue his secondary mission. This soon brought the Evertsen's squadron to Paramaribo at Surinam, Dutch Guiana, to be refitted and provisioned at Fort Zeelandia. Departing in May 1673, Evertsen's ships swept up the Windward Island chain of English and French Islands, hitting some and bypassing other in search of prizes and booty. To his surprise and good fortune, Evertsen encountered a Dutch squadron from Amsterdam under the command of Jacob Benckes off Martinique. The two commanders decided to join forces. With varying success, they attacked Montserrat, St. Christopher's, Nevis, and St. Eustatius. During June, the combined squadron were en route for Chesapeake Bay where they planned to raid the tobacco trade. Evertsen and Benckes arrived in the Chesapeake in July 1673. By the time they left, the Dutch had captured seven ships with thousands of hogsheads of tobacco and destroyed ten additional ships. Among the prisoners captured were some important figures from the New Jersey colony who had been en route to England. These included Captain James Carteret, Samuel Hopkins, and others connected with James Carteret's quarrels with the Lords Proprietors of New Jersey. They provided intelligence crucial to Evertsen's next target: New York. Hopkins revealed the weak condition of the garrison of Fort James on the southern tip of Manhattan Island.

On July 28, the Dutch fleet came to anchor off Staten Island. Dutch farmers from Staten Island and Long Island made their way to the squadron and informed the captains that not only was the majority of the population were unhappy with English rule, but the governor of the colony, Francis Lovelace, was absent from his post on a journey to Connecticut. Emboldened by this news, the Dutch acted swiftly. After a short bombardment of the fort, the English surrendered. Evertsen forced a radical change in the governance of the colony, the capital of which was renamed New Orange. Evertsen could not stay to oversee the considerable difficulties the shift to Dutch rule from New York to the Delaware River would entail with hostile English colonies in Connecticut, Maryland, and Virginia. He left these matters in the hands

of Captain Anthony Colve of the Netherlands Marines whom Evertsen appointed Governor General of the Province of New Netherland.

As Evertsen and Benckes departed, they sent a subordinate to accomplish their last raid, the destruction of the Newfoundland fisheries. Captain Nicholas Boes, originally under Benckes' command attacked and destroyed the almost defenseless fishing villages and vessels of Newfounland. Completing this mission with ease, Boes rejoined Evertsen at the Azores where the joint squadron was struck by a terrible storm, destroying several of precious prizes.

In December 1673, Evertsen brought his ships into Cadiz to refit and to communicate with his government. At that point Evertsen learned that while the Zeeland ruling council had not received all his dispatches, they were shocked by the news they had received. The province was in no condition to undertake the reinforcement and garrisoning of New Netherlands. They referred the matter to the States General which initially considered holding these gains, but as the implications of the acquisition became clearer, Evertsen's feat became more of a burden, a chip to be bargained away at the peace table. The war on land had gone badly for the Netherlands, and Spain was urging the Dutch to seek peace with England in return for her entry into an alliance against the French. By February 27, 1674, the Peace of Westminster had been ratified. One of its provisions returned the New Netherlands to English rule. The exploits of Evertsen's small Dutch naval squadron went virtually for naught. The commander would have to defend himself in Zeeland for aborting the St. Helena mission and choosing the "raid on America" which was so successful in unexpected but unwanted ways.

Authors Shomette and Haslach have skillfully recreated the history of an almost forgotten Dutch naval expedition that might have changed the balance of power in the New World. It is worth noting that naval historian Samuel Eliot Morison did not deign to mention the episode in his *Oxford History of the American People* (1965), nor did Charles R. Boxer treat the matter in his otherwise detailed social and economic history, *The Dutch Seaborne Empire, 1600-1800* (1970). Arthur Pierce Middleton's *Tobacco Coast: A Maritime History of Chesapeake Bay* (1953) does mention that part of the expedition that touched the bay, calling it a "serious blow to the trade and to the revenues of the Crown."

The authors' goal was "to provide a complete narrative of the campaign and its consequences" (p. xi). This they have done with perhaps more background information than was necessary. The narrative flow is frequently halted while the authors provide historical context of each place the squadron approached or attacked. On the other hand, two of the most interesting chapters are not maritime at all but deal with the upheaval in New Netherlands and surrounding colonies after Evertsen unexpectedly reestablished Dutch rule. The book shows extensive research in published primary and secondary sources. Much of the detail provided has come from Robert Haslach's translation of a collection of Netherlands official documents compiled by C. De Waard. The authors made good use of Victor Palsits' transcription and translation of the Evertsen Papers in the New York Public Library's Bontemantel Collection.

This book needs more maps. While it does contain two excellent maps drawn by Shomette and a few portraits, they are difficult to locate as there is no list of illustrations. Any book about naval operations should include maps detailing operations of consequence. For example, the publisher should have provided large scale maps of the Caribbean and Chesapeake Bay to complement the map of New Netherlands. These, however, are minor drawbacks. It is a pleasure see the complex colonial history of North America come alive against the backdrop of European affairs when the public seems to have forgotten almost everything before 1775. The University of South Carolina Press deserves applause for its continuing contributions to our neglected maritime past.

WILLIAM S. DUDLEY

Annapolis, Maryland

HAROLD M. HAHN, *Ships of the American Revolution* (London: Conway Maritime Press, 1988), hard cover, 279 pages, illustrations, index. £20.00.

This fine volume, filled with loving research, will be useful to anyone interested in ships. Model builders will delight in its opening up of challenges in models ranging from brigantine to ship of the line. Some are British built, but most are prizes converted as necessary. The new American frigate *Hancock* was the most valuable, but all served Britain well in a time of need.

Harold Hahn's research benefits greatly from the Navy Department *Documents of the American Rev-*

olution—as does that of writers on many subjects. He delves deeply in British Archives and especially the logs and Admiralty draughts of ships. He devotes a chapter to each of the six smaller ones. Step by step, in text and illustration, he explains how he built the model, including problems and solutions. Many chapters cover the ship of the line *Alfred*, including details of cannon and carriages, masts and rigging, deck gear and fittings, demanded by the small floating city of a ship.

This good book, however, goes far beyond model building. Based on logs it recounts the past, small or great, played by each in what began as unrest in some far off British colonies—unrest not satisfied, revolution followed, then World War.

Critics may condemn many log entries as tedious routine. Yet all have their purpose. In laconic seagoing language they fit into the intricate pattern of the war. Each has a purpose, and some correct minor errors of writers. Those of *Alfred* unify, clarify, and correct far reaching events of world significance through extended operations in the West Indies and the Atlantic. Including the fateful events of Yorktown, they show again that like all world wars from the time of Xerxes, sea power shapes the outcome and furthers the slow growth of freedom.

ERNEST MCNEILL ELLER

Annapolis, Maryland

EWAN CORLETT, *The Iron Ship: The Story of Brunel's SS Great Britain* (London, England, Conway Maritime Press, 1990). 10¼" × 7¾" cloth, 224 pages, 70 photographs, 100 drawings, 8 appendices, notes, index, 20 Pounds Sterling.

One would be very hard-pressed to find someone more qualified to bring the story of the SS. *Great Britain* to print than Ewan Corlett. He is a noted naval engineer and architect in his own right, as well as being the author of two books on merchant ships. This particular study can be best described as being a revision of his 1975 work on the same ship, which was released by another publishing house. His strong interest in this particular vessel stems, in part, from its many claims to fame, which include; being the first large, ocean-going passenger ship to be built of iron, as well as the first such vessel to be both steam-powered and screw-driven. Thanks to his efforts, interest in this unique and revolutionary vessel has been raised considerably. In time, his efforts led to her eventual salvage and restoration as an historical artifact.

His account of her design, career, and fate follows the standard chronological structure of works of this nature. His first chapters provide us with a concise history of the use of iron in ship construction prior to the conception of the *Great Britain*. He also explains what motivated the Great Western Railway to enter both the trans-Atlantic passenger and mail service as well as their decision to design and construct their own ships. This information is presented in a clear fashion, and from it we can understand why this firm decided to embark upon the construction of this revolutionary vessel.

He describes her actual construction and occasional redesigning in a concise manner. The latter, it should be noted, were usually caused by either Brunel's constant search for the best solution of the many problems posed by her novel features or the appearance of suitable equipment during the period of her construction. He also shows beyond a reasonable doubt that although she was laid down as the *Mammoth*, she was completed as SS *The Great Britain*. However, he bows to convention and refers to her as *Great Britain*.

Despite the very uniqueness of this ship, she rarely had the chance to prove her worth on the trans-Atlantic run despite an auspicious maiden voyage. In fact she seems to have been plagued with many misfortunes, and suffered at the hands of relatively inept captains. Nonetheless, he often seems to be unduly harsh upon the latter, given the many novel features of this ship's construction and propulsion system. Afterall, there were most likely a mere handful of captains who had both the requisite skill and technical awareness needed to realize the full potential of this ship. Another key determinant of her un-distinguished career was the early bankruptcy of the Great Western Railway. Corlett also provides details of her many guises and voyages, including her use as a troop ship in the Crimean War, and her last voyages as a sailing vessel with auxiliary steam power.

The last two chapters of the book are devoted to the vast effort made to salvage and restore her. He has wisely taken advantage of the restoration project by including recent photographs of her equipment and construction details. He has also utilized many original illustrations, drawings, and photographs of this vessel. His intense passion for this ship is obvious throughout

the book, and is very contagious. It is fitting that the publisher has included a plea from the restoration project for public donations and support.

Overall, this is an excellent account of both the ship, and the massive effort undertaken to restore her. It should be read by anyone interested in either this particular vessel or the history and practice of iron shipbuilding. As well, it should also appeal to anyone interested in naval salvage and preservation techniques.

PETER K.H. MISPELKAMP

Pointe Claire, Quebec

ERIC W. SAGER, *Seafaring Labour. The Merchant Marine of Atlantic Canada, 1820-1914* (Kingston: McGill-Queens University Press, 1989). 9″ × 6″, cloth, xxvi + 321 pages, b & w illustrations, notes, index. $34.95.

This book is one of the offspring of the Atlantic Canada Shipping Project of the Maritime History Group, which originated in the 1970s at Memorial University of Newfoundland. Over the years, the Project and its highly-regarded annual conference boasted a distinguished roster of participants. Eric Sager was part of the Project from the beginning. The results of his research have appeared in dozens of articles and papers and now coalesce in *Seafaring Labour,* which shares some of the strengths and weaknesses of MHG publications: imaginative and exhaustive use of quantitative data; self-conscious revisionism; a tendency to stretch data to the limit—and beyond—of interpretation; and a plethora of new insights and implicit suggestions for future research.

The book begins with three chapters on the ships of Atlantic Canada. Then follow a chapter each on the work of the sailors of the region, their origins, the ways in which conflict arose in the work place (the ship), the wages of sailors, and the seaman's "community" at sea. The final chapter discusses the "industrial workplace" at sea that arose because of the process that Sager is tracing.

The fundamental assumption of the volume is that seamen were (as David Alexander suggested over a decade ago) "working men who got wet," workers who, rather than being a special breed of humankind, simply labored on the water. The traditional view of the seaman—based on anecdotal accounts of his life—might present Jack Tar as an alienated hairy ape, but Sager suggests that closer attention to the numbers reveals something quite different. Readers inclined to dismiss quantification outright might be inclined to dismiss Sager's argument. But they should not be so hasty. Sager might be quantitative, but he has not turned his back on literary sources. If *Seafaring Labour* leaves the reader still believing that a special "sailor" personality did indeed exist, and doubting that sailors *were* indeed simply "working men who got wet," the problem is not so much methodological. Rather, certain theories about the past simply cannot be proven scientifically, because sufficient data will never exist.

The argument of the book is informed by the theoretical underpinnings of recent labor history. David Noble's *America by Design* and Harry Braverman's *Labour and Monopoly Capital,* for example, have shaped the questions Sager asks, the methodology he employs, and the answers he finds. Yet to understand any labor process, one *must* understand the technology involved; Marxist theory alone cannot suffice. Sager's thorough understanding of ships and extensive use of John Harland's *Seamanship in the Age of Sail* provide the book with that necessary component. This may not be the "salt-water tale" species of maritime history, yet it is no theoretical treatise by a landlubber.

Seamen under sail, Sager contends, were "preindustrial" workers. Their work, he explains, depended upon weather and the seasons; there was little specialization in tasks; it was mostly an environment of wood, not iron; power was supplied by wind and muscle; crews were small; the master and his crew shared the physical space; there was a lack of a "distinction between the place of work and the machinery to which labour was applied"; and workers applied manual skills to their task. The work discipline required by industrial capitalism was imposed with the advent of steam.

In Atlantic Canada's "preindustrial" coastal craft there was a sense of "service" to the master, yet also an "egalitarian ethic" not to be found under industrial capitalism. Because seamen on these small vessels tended to have a common language, similar homes, and personal or family ties with one another, there developed a sense of familiarity and cohesion, further reinforced by the "share system" by which they were paid. But as vessels became larger, they required larger capital investment, had to be owned by merchants, and thus were subject to greater paternalism, although fraternalism still existed.

Sager is particularly good at describing in detail the role and knowledge of the master of a coastal schooner, and the special skills required to work on a sailing vessel. Those skills, he argues, demonstrate the preindustrial nature of the work. Of course, devotees of sail have long spoken of the special skills required by that motive power. Sager is not making a new point; rather he is applying an old assumption to a new thoretical framework.

On the other hand, Sager concedes that working conditions aboard sailing ships were similar to conditions in the nineteenth century factory because of a "high ratio of capital to labour, constant repetition of specific tasks, very close supervision of workers, division of labour, and removal or work from home." He furthermore concedes early on that, "This was a preindustrial workplace, but very different from any known to landsmen." That is a critical distinction, and one that does not square with the fundamental assumption that seamen were simply working men who got wet. This implicit contradiction remains unresolved throughout the book.

Steamships represent industrial capitalism, according to Sager. It is therefore peculiar that a book examining an industry in transition rarely compares sail and steam directly. Sager needs to discuss the implications of the substantial superiority in tonnage held by steam after 1874. He does confirm recent suggestions that steam brought about new specialties and hierarchies, and new, high-paying positions for engineers. Yet he appears to be of two minds on the attitude of sailors toward steam, at times apparently confirming that sailors preferred steam, and elsewhere saying that seamen continued to choose sail over steam. On the other hand, Sager maps out carefully the gradual transition from sail to steam and demonstrates that it brought with it changes in "social relations." He is especially adept at demonstrating the connection between technology and labor, between the physical features of a vessel and the nature of work aboard it.

Sager maintains that the master of the sailing vessel was, essentially, a "craftsman," and the AB a "skilled mechanic." The work, though repetitive, required training, knowledge, and the ability to work with precision as part of a team. "If there is no such tangible record of skill, this does not mean that skill did not exist." There is a curiously retrograde quality to this argument. Although much of the book takes a revisionist stance to demythologize the seaman, Sager implicitly returns to an older and almost romanticized image of the highly skilled seaman under sail.

Sager believes that we have made the mistake of looking at sailor behavior through the eyes of nineteenth century middle class reformers, who were concerned with "respectable" or "socially unacceptable" behavior. If instead, he suggests, we view sailors as preindustrial, then questions of "respectability" have no meaning. In an attempt, therefore, to make his questions less "normative," he makes them more concrete and consequently more valuable. But while the questions are valuable some of the answers are probably still doubtful.

He argues, for example, that seafaring was not a career of last resort—that sailors went to sea for positive reasons. But he can support the point with, at best, literary evidence—which can be suggestive but never conclusive because anyone who left written records is in an elite and possibly unrepresentative minority. Sager also asserts that the declining percentage of Canadians in the fleet reflects the abundant opportunities for employment on land, a common suggestion for American maritime workers at the same period. But one also can argue that, with a plethora of jobs, those who remained at sea had no other choice: they were the bottom of the labor pool's barrel.

He also points to a 1/5 retention rate in his sample as proof of occupational stability and, presumably, job satisfaction. Some might argue that 1/5 is far from a "high" rate and that (as Sager himself admits) the correlation between the rate and occupational satisfaction is difficult to test. He claims that because sailors had to be informed of the destination and duration of their voyage, they were able to exercise "a degree of choice about the vessels in which they worked." But legal regulation is not the same as practice; we need to know how often a sailor actually changed vessels after learning of his first vessel's itinerary.

A good example of Sager's imaginative use of sources to support unorthodox claims is found in his discussion of literacy, which he states was increasing. First, he cites the requirement that masters and officers had to be literate to be licensed. Then, he leaps to a startling description of "the seaman as he often was—sitting on deck in the early evening, if the weather were fair, reading a book." His major proof for this astonishing image is Jack London's Wolf Larsen in *The Sea-Wolf*. Furthermore, Sager takes as a "crude measure of literacy" the ability to sign one's name, notes that three-fourths of the sailors in his sample could do so, concludes that "the majority . . . were

literate," and extrapolates the existence of his "reading seaman."

Like much modern labor history, *Seafaring Labour* sees the behavior of sailors as purposeful "worker resistance." In other words, the behavior of sailors was not just a matter of drunkenness, or poor qualifications. A typical form of resistance was the "withdrawal of labor"—by failure to join the vessel, or desertion, or refusal to work—that occurred most commonly because of poor working conditions. Sager has drawn on court and police records for some fascinating accounts of such behavior. Such accounts can suggest his thesis, but they cannot prove it.

A few minor comments are called for. Although the title claims the years of the study as 1820-1914, most of the attention is given to the period 1850-75, or to the 1890s. Although there is no separate bibliography and the notes are, alas, at the end of the book, Sager's command of a vast body of secondary literature is clear. In addition, his extensive immersion in the statistics of the Atlantic Canada fleets is evident throughout the discussion. Curiously, the end notes lack American sources—which might explain why the study needs more comparison with American conditions.

These criticisms notwithstanding, *Seafaring Labour* is a major achievement, filled with important insights and hypotheses. It is a case study in the use—and sometimes misuse—of sources, but also in the creative rethinking of comfortable old beliefs and attitudes, chestnuts and canards. A similar study now needs to be done for the United States—although first a United States version of the MHG needs to be established.

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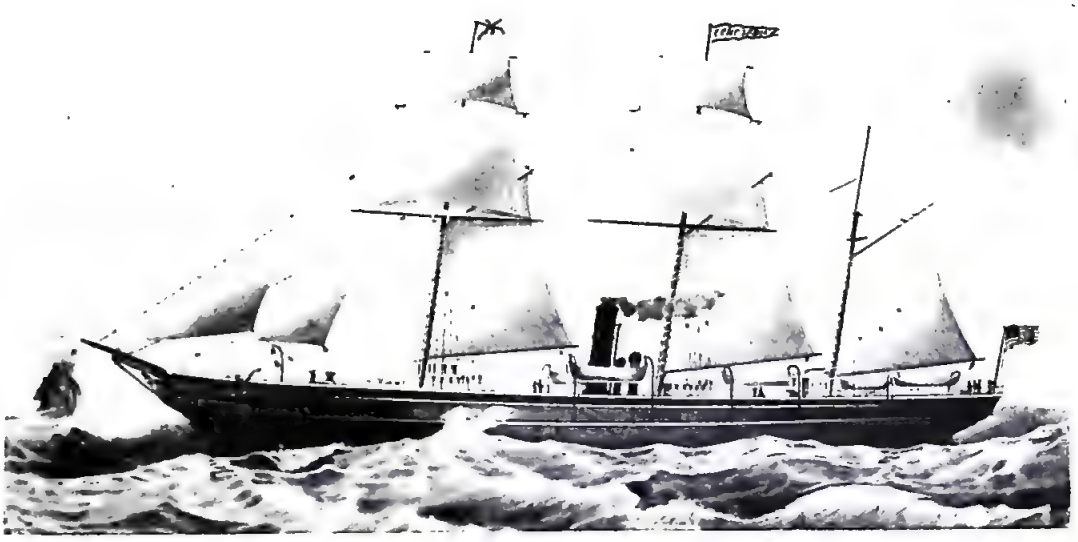

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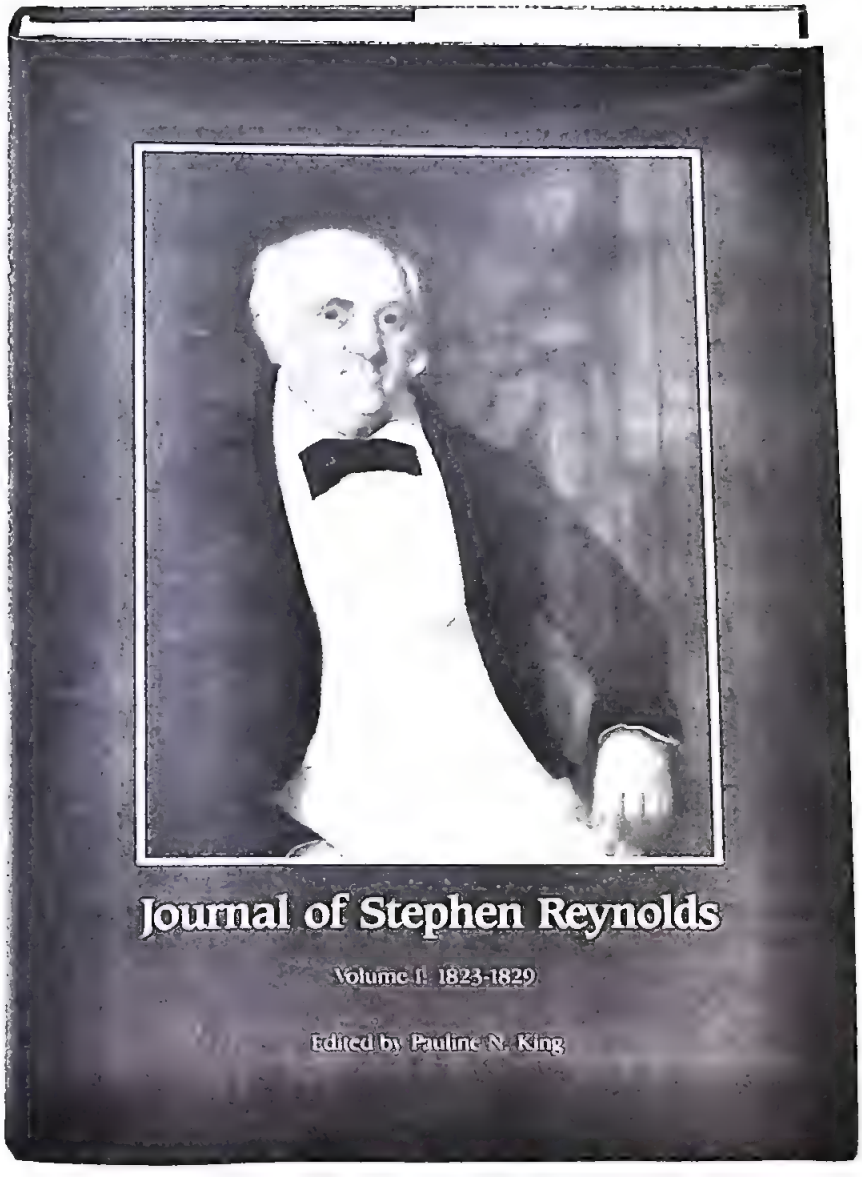

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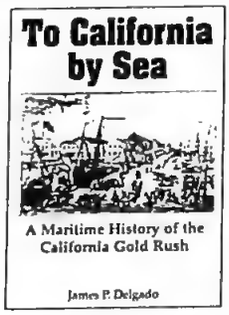

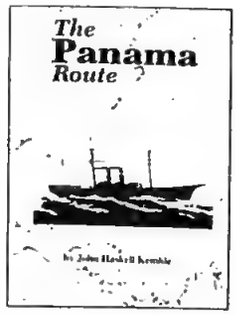

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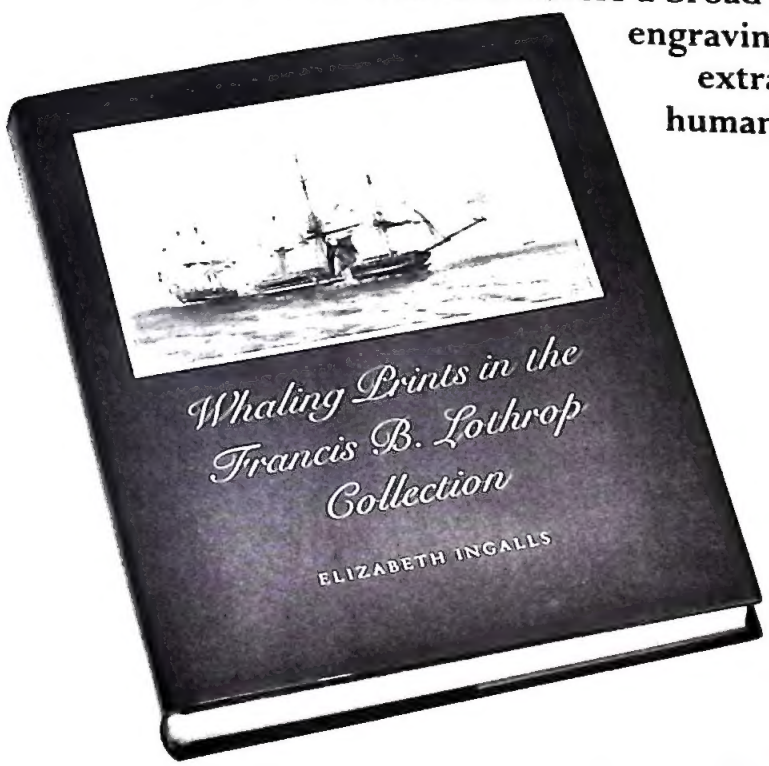

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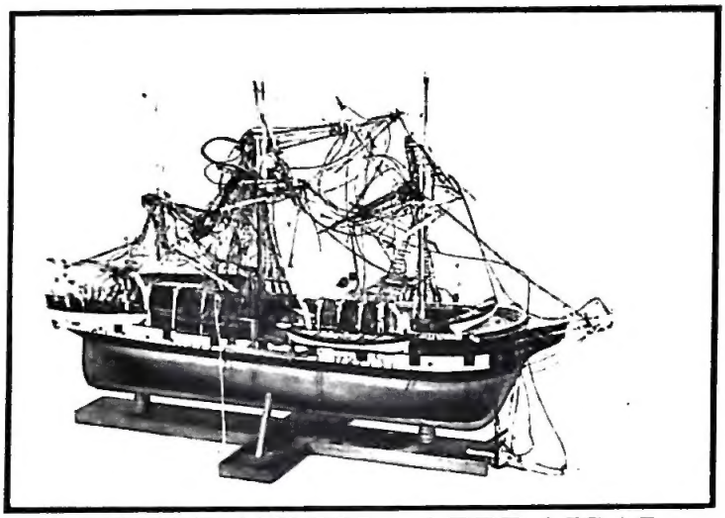

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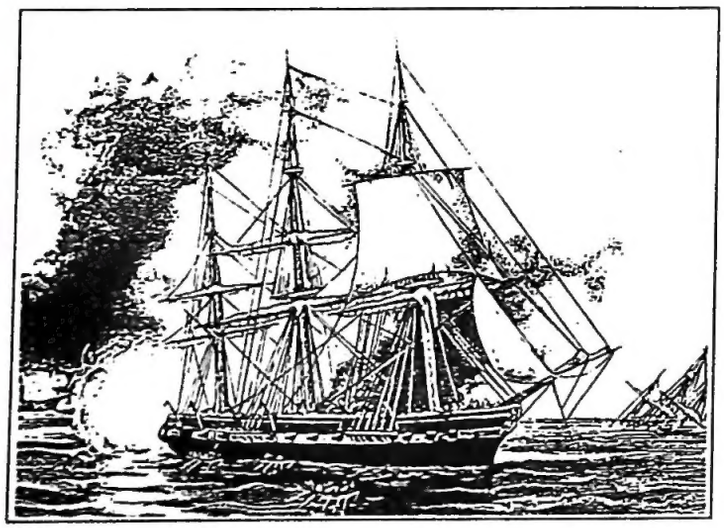

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